A Study of High School Teachers' Experiences Making Innovations to Instruction

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Dedications

To my parents, who instilled in me an appreciation for the importance of education.

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Abstract

A Study of High School Teachers' Experiences Making Innovations to Instruction

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Creativity and innovation are important for sustaining the relevance of schools in the changing world. Although innovation is a significant aspect of school improvement, we do not know how teachers perceive the experience of making innovations to instruction. The purpose of this mixed-methods study is to reveal how teachers experience making innovations to their instruction. The research questions for this study are as follows: (1) What key themes emerge as teachers describe their experiences making innovations to instruction? (2) What key themes emerge as teachers describe the environmental factors that influence the innovations they make to instruction? (3) What key themes emerge as teachers describe the leadership that influences the innovations they make to instruction?

Principals and a school district administrator were asked to identify English, math, science and social studies teachers in three high-performing suburban high schools who demonstrate the characteristics of innovative teachers based on existing research. The researcher administered the Reisman Diagnostic Creativity Assessment (RDCA) self-assessment and Dweck's mindset questionnaire to 21 high-school teachers. Most teachers in the study self-assessed themselves as having a moderately high to very high level of creativity and a growth mindset. The researcher conducted focus group and individual interviews with 14 of the high school teachers. Transcripts of the interviews were coded and the following major categories emerged: (1) Innovative Processes; (2)

Personal Feelings; (3) Risk Taking; (4) Teacher Motivation; (5) Limited Collaboration; and (6) Leadership.

These categories were synthesized into five themes that are presented as the results of this research study: (1) Teachers Make Innovations to their Instruction for Professional and Personal Reasons; (2) Teachers Need to Feel Secure Before Taking Risks; (3) Teachers Make Innovations to their Instruction with Limited Collaboration; (4) Leaders Can Increase the Likelihood that Teachers Make Innovations to their Instruction; and (5) Creativity and a Growth Mindset are Associated with Innovative Teaching. This study suggests the need for teachers to understand their students' experiences and be motivated to overcome barriers in order to make innovations. It also suggests the need for school leaders to encourage innovation and create conditions where it can take place.

Chapter 1: Introduction to the Research

Introduction to The Problem

Creativity and innovation are recognized as important for sustaining the relevance of various organizations including schools in the changing world (Kelley & Littman, 2005; Lichtman, 2014; Senge, Cambron-McCabe, Lucas, Smith, Dutton, & Kleiner, 2012). Students enter schools with diverse characteristics that necessitate different instructional practices. Technology is changing how students and educators interact with one another and the world around them. As research progresses, more effective instructional practices are identified. Because of the interest in creativity and innovation, they are common topics in popular business and education publications such as *Fast Company*, *Harvard Business Review*, and *Edutopia* (Heick, 2013; Hoque, 2014; Pisano, 2015). Additionally, school districts are increasingly identifying innovation as a significant area of focus. They include innovation as a strategic area in their long-term planning and hire administrators with titles such as Director of Innovation and Technology with the goal of increasing the use of innovative instructional practices.

The benefits of making innovations to educational practices can be far reaching. The Organisation for Economic Co-operation and Development recognizes the value of innovation in education in four areas: (1) improved learning outcomes; (2) enhanced equity and equality; (3) improved efficiency; and (4) maintained relevance (OECD, 2014). For schools to effectively educate students and remain relevant, they need to replace less effective practices with more effective practices. Furthermore, the benefits of supporting an innovative learning environment can extend throughout the school community. Employees who are part of creative and innovative organizations are more

"happy, enthusiastic, and optimistic" (Rasulzada & Dackert, 2009, p.196). The effectiveness of instructional practices depends, in part, on how and where they are put into place.

Education professionals and organizations identify practices that may be considered innovative. Instructional technology is often regarded as an indication of innovative instructional practices, although it is not necessary for innovations to make use of emerging technology. The NMC/CoSN Horizon Report identifies the teaching of computer coding and students using technology to create content as near term trends affecting the adoption of educational technology (Adams Becker, Freeman, Giesinger, Cummins, & Yuhnke, 2016). The National Science Teachers Association and National Council for the Social Studies both advocate shifting practices so students are actively involved in inquiry-learning and have opportunities to apply their learning in ways that are relevant to the world outside of school (NCSS, 2013; NSTA, 2016). However, innovative instructional practices are site-specific. What may be new and useful in one classroom is not necessarily new or useful in another classroom. An instructional approach may be regarded more or less innovative depending on what instructional practices teachers currently use.

The characteristics of individual teachers and the characteristics of the schools and school districts where they teach interact with one another to affect the instruction that is provided to students. Innovative instruction results from a complex interaction between the individual teacher and his or her environment (Thurlings, Evers, & Vermeulen, 2015). In order for educational leaders to make decisions that improve student learning, they must consider teachers' individual behavior within the larger

context of their school and school district. The innovations made to instruction directly impact student learning. Since teachers have significant control over classroom instruction it is important to understand the experiences of innovative teachers (Chetty, Friedman, & Rockoff, 2012; Hattie, 2009). Ultimately, it is the teacher who has the greatest effect on the instruction that they provided to students in his or her classroom.

Statement of the Problem to Be Researched

Although innovation is recognized to be an important aspect of school improvement, we do not know how teachers perceive the experience of making innovations to their instruction. Research into the experiences of innovative teachers will provide a more complete view of innovative instruction and how this instruction can be supported in schools. Innovations to instruction are further complicated because they are relative to the specific classroom, school, and school district while also existing within the larger context of the teaching profession. This research will help to surface some of the characteristics and experiences of high school teachers who are recognized for making innovations to their instruction. It is necessary to consider the experience of innovative teachers so other teachers and educational leaders can make informed decisions to encourage and sustain innovative teaching practices.

Purpose and Significance of the Problem

The purpose of this mixed-methods study is to reveal how teachers experience making innovations to their instruction. This study will contribute to the substantial research on creativity and innovation by providing information about teacher creativity and mindset and adding the voices of innovative teachers currently working in high-schools. By studying the experience of teachers who are recognized as innovative we can

gain insight into why and how these teachers make changes to their instructional practices. This understanding can be used by teachers and educational leaders to make informed decisions that can improve instructional practices.

It is important to understand the experience of teachers because they are a vital part of innovative educational systems. Thurlings, Evers, and Vermeulen (2015) state, "teacher innovative behavior is highly important for the further development of educational professions as well as school organizations and for our development as a knowledge society. Therefore, innovative behavior should be central to the teaching profession" (p. 431). If innovative teaching behavior is to be supported it is helpful to understand the lived experiences of teachers who are recognized as demonstrating innovative teaching behavior. This understanding can help educators within school systems make decisions to support innovative teachers and replace less effective practices with more effective practices.

It has been a significant challenge for school districts to make widespread improvements to classroom instruction. Despite the changes in curriculum and organization in schools over the last century, there have not been substantial changes to teaching (Cuban, 2013). School districts make enormous investments in professional development with the hope of improving teaching practices but have not seen substantial improvements (TNTP, 2015). Without teacher involvement and commitment, schools are unlikely to improve or adapt to the changing world.

Since teachers are ultimately responsible for implementing innovative instructional practices, it is important for educational leaders to understand their lived experiences. Teachers have great control over the pace of changes that take place in their

classrooms and schools. Teachers must be supportive of change initiatives efforts if they are to be sustained (Fullan, 2011). They have primary responsibility for the instruction that takes place in their classrooms and can change their instructional practices. A survey from U.S. Department of Education, National Center for Education Statistics found that over 90% of public school teachers said they have a “moderate” or “great deal” of control over the teaching techniques used in their classrooms (n.d.). Sustainable changes in schools are not likely to happen without the involvement of teachers and the support of administrators. It is important to understand teachers’ experiences and collaborate with them to improve professional practices. This study is designed to contribute to that understanding by using a mixed-methods approach to answer questions about the experiences of innovative teachers.

Research Questions

1. What key themes emerge as teachers describe their experiences making innovations to instruction?
2. What key themes emerge as teachers describe the environmental factors that influence the innovations they make to instruction?
3. What key themes emerge as teachers describe the leadership that influences the innovations they make to instruction?

The Conceptual Framework

Researcher’s Stances and Experiential Base

Research topics often originate from the researcher’s interests and experiences. This was the case with my research for this study. Researchers also approach their research with ontological, epistemological, axiological, and methodological assumptions

(Creswell, 2013). As a researcher, I must be aware of the philosophical assumptions, perceptions, and experiences I brought to my research. This awareness increases the likelihood that I can accurately represent the experiences of research participants and interpret my findings.

I approached my research through both the social constructivist and pragmatic frameworks. As a social constructivist, I believe people construct different realities based on their interactions with the world and each other (Creswell, 2013). By collecting and interpreting the realities of multiple teachers, I was able to construct my own understanding of educators' experiences who make innovations to their instruction. As an educator currently working in K-12 public schools, I also place great value in the application of research to develop solutions to problems. Although I appreciate "interesting" research, it has greater value to me if it is "useful" (Goldkuhl, 2012, p.144). Different research questions and situations require purposeful use of quantitative methods, qualitative methods, or a combination of both. Although aspects of reality are fixed and measurable, we must go beyond what is quantifiable to answer many important research questions. That was true for this research study.

From an ontological stance, I am interested in understanding the realities that people construct based on their perceptions. This study focused on how different teachers perceive making innovations to their own instruction. Each of these individuals constructs their own meaning of what it means to be a teacher and why they make educational decisions. The meanings these individuals construct are affected by their environment and their interactions with other people.

From an epistemological stance, I believe knowledge is gained through both objective and subjective methods. Objective instruments are useful but not sufficient to develop deep understanding of people's perceptions and experiences. It was important for this research to construct answers to the research questions based on data gathered from interviewing participants.

From an axiological stance, I believe that values and biases must be considered when conducting research and analyzing data. To the extent that these values may have an effect on the research findings, they are presented as part of the research. This way they may be considered in addition to my research findings and interpretations. My values have led me to a career in education and they have been further shaped by my experiences in education.

The stances above are consistent with mixed-methods and phenomenological methodology. Phenomenology seeks to understand the essence of the phenomenon as experienced by the participants (Moustakas, 1994). In this study, the phenomenon is making innovations to instruction. We have some understanding of innovation but it is important to gather the perspective of teachers to construct greater meaning of this phenomenon (Stasys, 2011). This study describes the nature of this experience and identifies teachers' perceptions of themselves, their environment, and leadership that affect innovations to their instruction.

I approach this study as not only a researcher but also a former teacher and current administrator in K-12 public school systems. I was a National Board certified social studies teacher, department chair, and Curriculum Coordinator in one high-performing school district and I currently serve as Assistant Director of Teaching and

Learning in another high-performing school district. As a classroom teacher and administrator, I have worked directly with teachers to develop and evaluate curriculum, assessments, and instructional practices. I believe teaching is a noble and important profession.

As professionals, I believe teachers have a responsibility to use their experiences and knowledge from the field to improve their practices. I also know that different teachers regard their role and responsibilities in different ways. I have seen firsthand the effect that teachers have on the quality of their instruction and, as a result, student learning. At the same time, teachers' work is affected by the schools and school districts where they work. Since administrators and community members influence the environments in schools and school districts, educational leaders at all levels of school systems must collaborate with the community to create conditions that support improvements to educational systems.

One of the fundamentally important aspects of educational systems is the instruction that is delivered to students on a daily basis and the learning that results. Improvements to instruction are important because they not only help students learn and enjoy their experiences in school, but also contribute to positive changes for society over time. For these reasons, I researched teachers' experiences making innovations to their instruction and I would like to use the finding of this study to help improve my practices and the practices of other educators.

Conceptual Framework

The researcher entered this study with a conceptual framework that addresses creativity, innovation, mindset, and leadership. This framework formed a starting point

for understanding teachers' experiences making innovations to their instruction. Although innovative instructional practices are implemented by teachers, they are influenced by a combination of personal and environmental characteristics. Through a review of relevant research, three literature streams emerged to support this study. These streams are (1) Creativity and Innovation; (2) Mindset and Innovation; and (3) Leadership for Creativity and Innovation.

Creativity and Innovation. Teachers must develop their instructional techniques and apply them creatively to enhance student learning (Marzano, 2017). In this stream, an interdisciplinary review of significant literature dealing with creativity theory and its relationship to innovation is presented. Despite creativity being a field of research for over fifty years, there is still debate over how creativity should be defined (Runco & Jaeger, 2012; Simonton, 2012). However, it is understood that creative ideas are generated in individuals as a result of both personal and environmental factors that contribute to creativity (Amabile, 1998; Sternberg, 2006). Furthermore, there are different models of creativity that should be considered when thinking about teacher creativity and innovation (Kaufman & Beghetto, 2009). Together, this stream presents a context for creativity and innovation that affects the experience of individual teachers.

Mindset and Innovation. To innovate, teachers need to believe that they can improve their professional practices and persist in putting improved practices into place. In this stream the theoretical underpinnings of mindset will be explored. Dweck (2006) provides examples of extraordinary teachers with a growth mindset who are dedicated to the belief that all children can learn in her book *Mindset*. However, a much larger number of teachers make the decision to create new ideas and implement them in their classrooms

without national attention. Although research is limited on the relationship between growth mindset, creativity, and innovation, people who believe they can improve their practices through effort are more likely to succeed in doing something new. School and district leaders have important reasons to understand how to support a growth mindset in teachers and administrators in order to improve the quality of education in individual classrooms and school districts at large.

Leadership for Innovation. Although the characteristics of individual teachers are an important determinant of the quality of instruction, the situation where teachers teach is often more important (Kennedy, 2010). Leaders in schools and other organizations can affect the amount and quality of innovation that occurs and spreads. Directly, leaders can work with other people through the different phases of the innovation process to help teams generate ideas and put those ideas into place. Indirectly, leaders affect the culture of an organization and can contribute to a vision that supports innovation. Researchers cannot adequately understand the experience of individual teachers without considering the larger context that affects their thinking and behavior. That context is affected by school and school district leaders.

Definition of Terms

Creativity: Ideas that exhibit both originality and value (Amabile, 2013; Hennessey & Amabile, 2010; Ford, 1996; Plucker, Beghetto, & Dow, 2004; Runco & Jaeger, 2012)

Fixed mindset, or entity theory of intelligence, is the belief that one's abilities and intelligence are static (Dweck, 1986; Dweck, 2006).

Growth mindset, or incremental theory of intelligence, is the belief that one can develop their abilities and intelligence through effort (Dweck, 1986; Dweck, 2006).

Innovation: Implementation of creative ideas to benefit individuals, groups, or organizations (Janssen, 2003; Mayfield, 2011; Reisman, 2016)

Innovative Instruction: Use of new ideas, methods or strategies and activities by teachers to improve the teaching and learning processes (Zhu, Wang, Cai, & Engels, 2013).

Assumptions, Limitations, and Delimitations

Assumptions

1. It is assumed that administrators in the school district will accurately identify teachers who make innovations to their instruction.
2. It is assumed that those teachers who are identified by administrators will participate in the study and they will be willing and able to describe their experiences making innovations to their instruction.
3. It is assumed that the findings of this study will be useful for increasing the likelihood that teachers implement new and useful instruction in their classrooms.

Limitations

1. Administrators may not know which teachers make innovations to their instruction.
2. Since the sample size is small, the results will not be generalizable to all teachers, schools, or school districts.

Delimitations

1. This study is limited to core content area teachers (English, mathematics, science, and social studies) in three high-performing, suburban high schools.
2. The teachers who participate will not be a representative sample of all teachers

who make innovations to their instruction. It will include those teachers who are identified by administrators and are willing and able to participate.

3. Because the focus of this study is on the experiences of teachers, there is no attempt to review the implementation of innovative instructional practices or determine the effects of those practices on students.
4. This study attempts to discover the existing experiences of high school teachers without additional intervention.

Summary

It is important for teachers to make innovations to their instructional practices in order to meet the needs of students and ensure the relevance of schools. As the needs of students and our understanding of effective instruction changes, educators need to implement new and useful practices. Teachers have great influence over the quality of instructional practices in their classrooms and the education that their students receive. Teachers' decisions about making innovations to their instructional practices are affected by personal characteristics and the environment where they teach. In order for educational leaders to support innovative instruction, they should understand the experiences of teachers who make innovations to their instruction. The experience of innovative teachers can be framed within the literature concerning creativity and innovation, mindset, and leadership.

Chapter 2: Literature Review

Introduction

This mixed-methods study is designed to reveal how high school teachers experience making innovations to their instruction. Since teachers' innovative behavior is affected by individual and organizational factors it is important to consider the characteristics of teachers and their environment (Thurlings, Evers, & Vermeulen, 2015). This interdisciplinary literature review will explore three streams (see Figure 1): Creativity and Innovation; Mindset and Innovation; and Leadership for Creativity and Innovation. The first theme presents an overview of significant literature regarding creativity and its relationship with innovation in an educational context. The second stream presents research into mindset and its relationship with innovation. The third stream explores the role of leaders in promoting creative and innovative behavior. Together, these streams situate the experience of teachers at the intersection of individual and environmental factors that affect innovative instruction in schools.

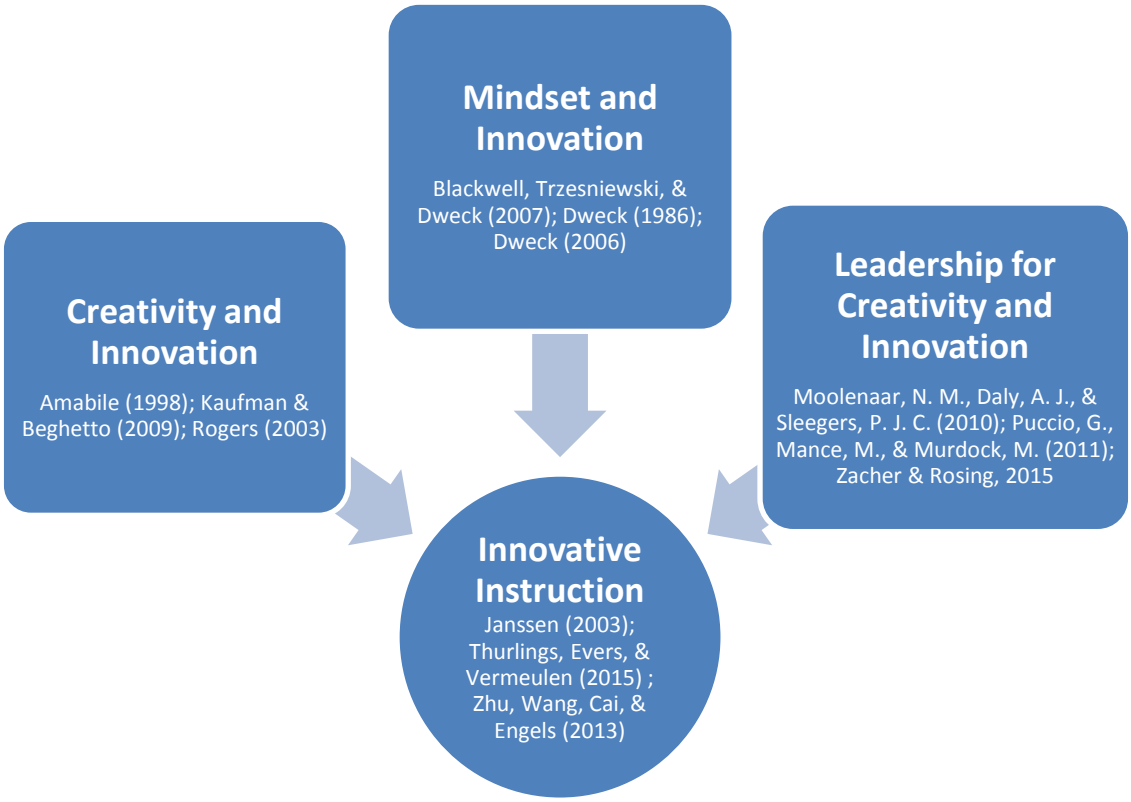

Figure 1. Conceptual Framework

Literature Review

Literature Stream 1: Creativity and Innovation

Teaching is a complex activity that has many opportunities for creative decision-making and innovative instruction. Marzano (2017) likens teachers to artists who refine their techniques and creatively apply those techniques so students learn. Teachers can demonstrate creativity in their planning prior to the lesson, in their modifications of lessons for individual students, and while improvising during a lesson (Hall & Smith, 2006; Rejskind, 2000; Sawyer, 2004). The teacher's decisions at any of those points will

have an effect on the type and quality of instructional practices they implement and the experiences of their students. A teacher's ability to think creatively has been found to have a positive relationship with their problem solving ability (Davidovitch & Milgram, 2006). When teachers decide to put creative ideas into action they are being innovative. It is not only the characteristics of individual teachers, but also the larger context of their schools and society that affect a teacher's creative and innovative instructional decisions. To understand how teachers and administrators experience innovations in teaching, it is necessary to consider the foundations and contexts of creativity and innovation.

Foundations of Creativity

There is not a universally accepted definition of creativity but it is widely recognized that creative ideas need to exhibit both a) originality and b) value, or synonyms of those two words (Amabile, 2013; Hennessey & Amabile, 2010; Ford, 1996; Plucker, Beghetto, & Dow, 2004; Runco & Jaeger, 2012). Runco and Jaeger (2012) state, "The *standard definition* is bipartite: Creativity requires both originality and effectiveness" (p. 92). In education, the value of teachers' instructional practices can be judged based on the effect they have on student learning. These instructional practices can be on the scale of an instructional technique, a lesson, a unit, an entire course, or an entire program.

There is some disagreement about the definition of creativity. One criticism is of the requirement that creative ideas have value because the value of those ideas may not be recognized until long after the time of their creation (Weisberg, 2010). It is possible that creative teaching ideas may be appreciated more when educational values and

measurements change. Unfortunately, many creative instructional techniques are not shared with the wider world or preserved to be reevaluated by posterity. So, creative teaching ideas may not have the opportunity to be appreciated over the long term. Furthermore, teachers assess the effect on student learning in the relatively short term. Usually within a lesson, at the end of a teaching unit, and at the end of a course.

Other researchers believe the definition is incomplete. For example, Simonton argues that a creative idea must be quantified as "new," "useful," and "surprising" (2012, p. 98). Similarly, there is concern that a common definition of creativity needs to enable the phenomenon to be measured. Brougher & Rantanen (2009) suggest a definition that requires creativity to be applied to new situations. For practical applications to teaching, the usefulness of creative instructional ideas is sufficient. These ideas do not need to be surprising as well. It may be helpful if creativity can be measured for clinical testing, but it is not as important for educational practitioners who may be exercising creativity in the design or implementation of instructional practices. Both originality and value are important components of creativity in teaching.

Importantly, creativity is not limited to a few special individuals. The ability to be creative is widespread throughout the population. In Guilford's address to the American Psychological Association in 1950, that gave impetus to the study of creativity, he recognized that creative characteristics are found in almost all people. A variety of forms of creativity are recognized even though there has been an emphasis on the creativity of renowned individuals (Gardner, 1993). People like Ben Franklin, Albert Einstein, and Steve Jobs demonstrated *Big-C*, or eminent creativity. Most creativity falls in to the category of *little-c*, or everyday creativity.

Little-c creativity includes new ideas people have for solving problems in their daily lives. Other researchers propose that creativity can be further categorized as *mini-c* and *Pro-c* (Kaufman & Beghetto, 2009). *Mini-c* labels personal and developmental creativity that does not rise to the level of *little-c,* and *Pro-c* labels creativity exhibited by professionals that has not risen to the *Big-C* level. At different times, people may exhibit different levels of creativity. Most creative teachers operate at the little-c or *Pro-c* levels. Since creativity is not restricted to a few geniuses, it can be exhibited by many teachers in schools on a regular basis. Individuals who exhibit creativity at any level draw upon personal attributes in a relationship with their environment.

Creativity in Context

Creative ideas emerge from a complex relationship between the individual and their environment. The componential theory of creativity holds that creativity requires the individual to possess expertise in their area, creative thinking processes, intrinsic motivation, and a supportive social environment (Amabile, 1983; Amabile, 1988; Amabile, 2013). All four components are involved in different stages of the creative process from task identification to outcome (Amabile, 1996). Amabile's research demonstrated that creativity does not spring solely from unique individuals but was exhibited by intrinsically motivated people in the right environment. According to Amabile (1988), "Individual creativity is the most crucial element of organizational innovation, but it is not, by itself, sufficient. And features of the organization can be the most crucial determinants of an individual's creativity at any point in time" (p. 125). The environment can affect all individual components of creativity, especially task motivation

but also domain expertise, in a variety of ways (Amabile, 1996). Individual creativity is affected by environmental forces at multiple levels.

A person's creativity is enhanced or diminished because of their interactions with groups, organizations, institutions, and markets (Ford, 1996). The dynamics of groups can influence the creativity of the group. Research has found that groups comprised of creative individuals can be more creative, but the group must support creative behavior (Taggar, 2002). People may need to navigate multiple social domains to gain acceptance of their ideas and this can affect whether the person takes creative or habitual action (Ford, 1996). Major theories of creativity describe creative behavior originating as a result of an individual's characteristics that are affected by the environment. Some theorists regard creative action as primarily a choice that few individuals make.

Environments can support or reject creative behavior to different extents and individuals respond differently to the resistance their creativity faces. Like the componential theory of creativity, the investment theory of creativity also identifies the importance of knowledge, motivation, and environment but places greater emphasis on the decision and willingness of a person to be creative (Sternberg, 2006). The investment theory of creativity posits that individuals draw upon intelligence, knowledge, thinking styles, personality, motivation for creativity, as well as their environment (Sternberg & Lubart, 1992). Each of these attributes requires a decision by the individual to pursue creative thought and those decisions are not easy to make. When someone introduces a creative idea, the world outside of that individual helps to determine its value. There is a subjective aspect to what is regarded as creative, and valued, by society (Csikszentmihalyi, 1988). The theories that argue creativity comes from an interaction

between individual and environmental factors have been supported by research in different organizations.

Research on creativity among employees in business organizations is consistent with theories of creativity. Hunter, Bedell, and Mumford's (2007) meta-analysis of 42 quantitative studies supports the conclusion that an organization's climate is strongly related to creative achievement. Their research found that when people perceived their job to require creativity and innovation, they had the autonomy to do their work, and were encouraged to exchange ideas with colleagues, they were more creative. Furthermore, organizations without centralized control and organizations that had the resources to support creative ideas were more creative. In addition, organizations that felt pressure to generate creative ideas were more creative. This study did not analyze how these climate factors may interact with one another to affect creativity and innovation. These studies have use for educators because there are similarities between the experiences of people in business and education. Since the contexts are not the same, it is helpful to consider research that is specific to creativity in educational settings.

Although evidence from studies of educators is consistent with theories of creativity, creativity in schools has not been studied to the same degree as creativity in business (Hennessey & Amabile, 2010). A meta-analysis of 13 qualitative case studies and 2 quantitative studies of creative teachers support the interaction between teachers' personal characteristics and their communities as the source of creativity (Bramwell, Reilly, Lilly, Kronish, & Chennabathni, 2011). Furthermore, a qualitative exploratory study, not included in Bramwell and colleagues' (2011) meta-analysis, also found that creative personality traits, intrinsic motivation, positive attitude, desire to improve

teaching and learning, and environmental factors emerged as themes that contributed to the creativity of ten primary school gifted teachers in Hong Kong (Chan & Yuen, 2014). The findings of these studies point to the importance of teachers and administrators working together so creative teaching can happen in schools (Bramwell et al., 2011). It is important to consider how the climates of schools interact with the personal factors that are associated with creativity and innovation.

Creative ideas emerge from a complex combination of individual and environmental characteristics. Creativity is the source of original ideas with the potential to benefit individuals and the larger society. In schools, this will include new instructional methods and approaches that have the potential to improve how educators instruct students. Creative instructional ideas must be implemented to have an effect on students and the larger school community.

Foundations of Innovation

Innovation is closely related to creativity but they are not identical phenomena. Creativity is the generation of new and useful ideas and innovation is the implementation of those ideas (Reisman, 2016). Janssen (2003) defines innovative behavior as “the intentional generation, promotion and realization of new ideas within a work role, group or organization, in order to benefit role performance, the group or the organization” (p. 348). This definition recognizes the progression of an innovative idea from creation into practice. Innovation consists of using a new idea in an existing place or using an existing idea in a new place. Mayfield (2011) defines innovation as, “Creativity purposefully applied to solving a given problem. Such an application can be applying a completely new idea to the given problem or applying an existing innovation in a new setting” (p.

658). The first sentence of Mayfield's definition requires that teachers act purposefully to put innovative ideas into practice for a specific reason. The focus of innovation is the intentional use of a new idea (West & Farr, 1990). Teachers may also use their creativity to continue implementation after the innovation has begun (Paulus, 2002; West, 2002). The second sentence in Mayfield's definition is important because it recognizes that teachers do not need be the original creator of an instructional practice for it to be considered innovative. Creative people extend their impact by sharing their ideas.

An innovative teacher may develop his or her own ideas and put them into place in his or her classroom. An innovative teacher may also use a new idea that came from an external source such as a colleague, professional development session, or the internet. It is not necessary for an innovative instructional practice to originate with the person who implements it (Marks-Maran, 2015; Rogers, 2003). An innovation can be shared with other people who use or modify it (Ford, 2006). Similarly, an existing instructional practice may be perceived as innovative because it is new to the people who experience it (Rogers, 2003). This is significant because it reduces the burden on teachers to generate new ideas all by themselves. It also allows innovations to spread and be widely applied.

Rogers (2003) identified five stages of the innovation adoption process: *knowledge*, individuals become aware of a new idea, process, or product; *persuasion*, individuals develop a negative or positive attitude towards the innovation; *decision*, individuals decide to use the innovation or not; *implementation*, individuals put the innovation into use; and *confirmation*, individuals solidify their decision to use the innovation. It has been recognized that people do not move sequentially through each stage of this process (Van de Ven., Polley, Garud, & Venkataraman, 2008). Nevertheless,

Roger's (2003) model is still useful as a broad view of the decisions teachers may make that can affect their use of innovative instructional practices. Based on this model, a teacher must be knowledgeable about an innovation, interested in the innovation, decide the innovation is worth their effort to try, and find the innovation agreeable, in order for them to adopt the innovation for use in his or her classroom. There are various factors that can affect a teacher's decision to put an innovation into practice.

Rogers (2003) also describes factors that influence the rate an innovation will be adopted. Organizations will have innovators and early adopters who are willing and able to implement innovations first. For later adopters, the rate of adoption is determined primarily by how people perceive the quality of the innovation in relation to the status quo. People are also likely to innovate more quickly when the innovation aligns with their values and experiences; if it can be tried on a small-scale; and if the results are observable. People were less likely to accept an innovation if it is perceive to be complex. In practice, there are a variety of contextual factors that affect innovation in schools. These factors range from individual feelings, to school structure, and even to national and international trends.

Innovation in Context

Innovations can take place at different levels, including the individual, team, and/or organization, and these levels affect one another (Anderson, Potocnik, & Zhou, 2014; Janssen 2003). Since innovative practices that are implemented in the classroom will oftentimes originate elsewhere within or from outside a school district, it is important to consider how these ideas may spread and what factors might limit their adoption. Teachers have reported that they make innovations to their practices for a variety of

reasons including the goal of improving their teaching, professional development experiences, technological changes, personal boredom, and the needs of their own children (Emo, 2015). Furthermore, teachers are more innovative when they reflect on their behaviors and the results of their behaviors (Messmann & Mulder, 2015). Innovation is affected by a variety of complex factors including personal relationships and the structures of schools within larger societal contexts.

Teachers need to have the knowledge, ability, and mindset to innovate their instruction. Zhu, Wang, Cai, and Engels (2013) state that four core competencies are important for innovative teaching. They identify those competencies to be 1) learning competency, 2) social competency, 3) educational competency, and 4) technological competency. Learning competency is the teacher's ability and willingness to learn about innovative instructional approaches. Social competency is the ability to work well with others. Education competency is a passion for education and guiding student learning. Technological competency is the ability to use current technology to deepen learning. Their quantitative research found that the last three of these competencies were associated with innovative teaching in the classroom. In addition to personal characteristics, interactions with other people also affect innovative behavior.

Personal relationships influence people's experiences with innovative behavior. Trust and care are significant factors in innovative behavior. Employees suggest more ideas when they trust they will experience some of the benefits from those ideas and employees will implement an idea when they trust the organization will listen to their thoughts (Clegg, Unsworth, Epitropaki, & Parker, 2002). Furthermore, when employees feel cared about by their colleagues, they are more likely to feel motivated to and

engaged in innovative behavior (Vinarski-Peretz & Carmeli, 2011). At the same time, innovative behaviors can contribute to conflict between teachers who implement new ideas and their coworkers (Janssen, 2003). Personal relationships within a school can affect the likelihood that innovative ideas are shared and put into place. Although individual teachers have some control over their personal relationships, they have less influence over other factors that affect innovations beyond the classroom level.

Teachers make instructional decisions within a larger context that affects innovative practices in their classrooms. Although teachers have the greatest influence on the sustainability of innovation in schools, factors including administrative support, professional development, and student support are also recognized as essential (Owston, 2007). The larger educational context is one of the primary reasons it has been difficult for individual schools to initiate and sustain innovative practices over time. Even when schools are started as innovative learning organizations, it is challenging for them to maintain their approach. Outside forces, especially standardization, and internal forces, including attrition, exert pressures to conform to traditional approaches over time (Giles and Hargreaves, 2006). Similarly, a study of charter schools found that they are not more innovative than their local public schools (Preston, Goldring, Berends, & Cannata, 2012). It should be noted that this study did not investigate classroom instructional practices.

When innovative ideas are being put into place school-wide, it is helpful for people to understand what is happening. Teachers who have lower levels of uncertainty are more likely to agree with the principles of a new program that is given to them from an outside source (Geijsel, Sleegers, van den Berg, and Kelchtermans, 2001). At more innovative schools, leaders are able to influence the perceptions of teachers but that

influence has its limits. More teachers agree with the principles of innovative programs, than actually put the programs into place (Geijsel et al., 2001). A significant aspect of the educational context that affects innovation is the structure of schools.

The structure of an organization has a large effect on the nature and degree of innovation that takes place there (Kelley & Littman, 2005). Schools have been criticized for being established as an industrial model that is no longer aligned with the needs of the modern world (Senge et. al., 2012). High schools are typically organized by departments based on discipline. The structure of departments as self-contained units that may interact with one another around some topics of mutual interest places a significant limitation on the ability of teachers to implement large innovations within schools (Christensen, Clayton, Johnson, & Horn, 2008). This is similar to the health care sector where isolated roles impeded innovation. It was found that professional roles within the health care sector inhibited the spread of innovation because of the boundaries between these professional domains (Ferlie, Fitzgerald, Wood, & Hawkins, 2005). When teachers identify their professional role too narrowly it becomes a barrier to adoption of innovations across departments.

Resolving the structural challenges of schools will increase innovative possibilities. This could include redesigning the relationship between departments so there are not as isolated from one another. For this to happen, members of those departments and administrators must form new working relationships within the school model (Christensen, Clayton, Johnson, & Horn, 2008). This alone will not transform the educational system but it may allow for innovations to take place on a larger scale than

the classroom level. In any case, sustainable innovation will require collaboration between teachers and administrators.

The actions of innovative teachers take place within multiple contexts that can affect their instructional decisions at different points of the innovation process. Teachers who make innovations to their instruction have individual characteristics that support their use of new and valuable practices. They may have generated creative instructional ideas on their own or adopted them from elsewhere. In either case, their environment must be conducive to some level of innovation. Since innovative ideas are new, they need to be reflected upon and improved after they are first used. They also tend to meet resistance because they challenge the status quo to some degree. The mindset of a teacher will affect how they respond to both the setbacks that come with developing new ideas and the resistance they face when they try to implement those ideas.

Literature Stream 2: Mindset and Innovation

For teachers to make innovations to their instruction they must believe that improvement is possible and they are capable of putting those innovations into place. Since obstacles and setbacks are natural parts of the innovative process, people need to persevere when faced with challenges. The human-centered design approach to innovation recognizes the importance of perseverance. IDEO (2015) emphasizes the need to stay focused on solving the problem by embracing the failure that comes with trying as an opportunity to learn. IDEO also celebrates the need to embrace the right mindset when developing innovative approaches to challenges. Among the mindsets they identify as essential are creative confidence, learning from failure, optimism, and iteration. These align directly with the concept of a growth mindset as identified by Carol Dweck (1986;

2006). The belief that people can develop their abilities and overcome obstacles through effort are fundamental characteristics of a growth mindset. Teachers with a growth mindset have the beliefs that will help them make innovations to their instructional practices.

Mindset Theoretical Underpinnings

Thirty years ago Dweck presented evidence that the goals children have when engaged in cognitive tasks affect how they respond to the results and their performance on subsequent tasks (1986). Her research fit into the existing social-cognitive field of psychology, which emphasizes that a person sets goals and evaluate himself or herself based on their perception of their progress towards those goals (Olson & Dweck, 2008). A person with a fixed mindset, or entity theory of intelligence, believes that their basic qualities are static. A person with a growth mindset, or incremental theory of intelligence, believes they can develop their abilities through effort (Dweck, 1986; Dweck, 2006). Creativity and innovation are not found only in unique individuals. All teachers can make innovations to their instructional practices and put those practices into place, but it takes commitment and persistence.

Findings support the positive effects that learning goals and a growth mindset have on achievement and persistence. When someone with a fixed mindset encounters a difficult situation, they are likely to shy away from the challenge. To this person a failure would mean that they are not smart or capable. Someone with a growth mindset is more likely to accept the challenge; they believe that through effort, they will be able to prevail (Blackwell, Trzesniewski, & Dweck, 2007; Grant & Dweck, 2003; Haimovitz, Wormington, & Corpus, 2011; Komarraju & Nadler, 2013). In contrast, one study of

adults who returned to school did not find evidence that their mindset was related to performance goals, but it should be noted that the sample-size was small (Dupeyrat & Mariné, 2005). The research into the positive effects of developing a growth mindset in students are so encouraging it has been summarized and shared by professional organizations as one of the most effective approaches for improving student learning (American Psychological Association, 2015; Deans for Impact, 2015). Overall, these findings are important because they establish the effect that mindset has on a person's motivation and willingness to persevere.

There has been less research into the mindset of people with positions of formal authority but existing research demonstrates that mindset has an important effect on their behavior as well. Managers with a fixed mindset make quick judgments about employee potential and do not change their opinion even when evidence suggests otherwise (Heslin, 2009). This is consistent with findings that showed instructors with a fixed mindset were less likely to change their initial opinion about students' math ability (Rattan, Good, & Dweck, 2011). Since both managers and teachers exert significant influence over the development of those they supervise, the stifling effects of people with a fixed mindset or the supportive effects of people with a growth mindset are consequential. Although most of the research focuses on the mindsets of individuals, evidence suggests that the culture of an organization can reinforce a mindset and affect people's behavior.

The general mindset of an organization has the potential to affect large numbers of people. Clinical experiments indicate that people who want entry into an organization will display the side of themselves that conforms with mindset that organization portrays

and that mindset will affect their self-concepts (Murphy & Dweck, 2010). This research suggests that an organization that demonstrates a growth mindset will help to develop a growth mindset in those people who enter the organization. This virtuous cycle can reinforce a mindset that contributes to improvements in the organization. If the norms, values, and beliefs of a school support the belief that teachers can develop their instructional abilities through effort and perseverance there is reason to believe that instruction in that school will be more innovative. However, more research is needed to determine the nature of the link between mindset and innovation in school.

Recent research has found that mindset is not having the positive effect on teachers' professional practice that it might have. In a study of three large school districts, TNTP (formerly The New Teacher Project) found little difference between the mindsets of teachers who improved their instruction and those who did not (2015). The TNTP study investigated mindset with regard to reflection, perception of primary responsibility for improvement, and admission of weaknesses, but does not consider growth mindset in the same way Dweck defined it. However, the TNTP report does recommend that school systems change their "mindset" to encourage "growth" (2015, p. 35). So, this study recognizes that mindset can support improvements to professional practice. Similarly, John Hattie reports that mindset has a low effect size for improving teaching and learning but has the potential to be much higher if adults change their mindset to a growth orientation (DeWitt, 2015). This research highlights the multifaceted and potentially significant relationship between mindset and professional practice. It suggests that students may not be benefitting to the degree they would if more educators had a growth mindset.

A growth mindset has a positive effect on the behavior of both children and adults. People who believe they can improve themselves through effort and persistence do and people who believe they cannot influence their development are more likely to stagnate. Research shows that a teacher's mindset will affect their behavior but has not established the extent to which growth mindset affects teachers' instructional practice. Nevertheless, there is reason to think that teachers with a growth mindset will be more likely to innovate their instructional practices. While research has improved our understanding of how mindset affects behavior, some of the research that is most consequential for practical application has found that mindset is malleable.

Developing a Growth Mindset

Since people with a growth mindset are more likely to put effort towards a goal and demonstrate resilience when faced with obstacles, there is reason to believe that a growth mindset will support innovative practices. For teachers, mindset can affect their desire, willingness, and ability to improve their practices and provide quality instruction to students. Some of the most encouraging research into supporting a growth mindset has demonstrated positive effects on students from relatively small-scale interventions (Dweck, 2008). However, most of the research has focused on developing a growth mindset in students and has not investigated ways to support a growth mindset in teachers. Furthermore, the little research that has been done into the cultural mindset of organizations has not focused on schools. Overall, research has found that it is possible for people to change their mindset and achieve greater success in academic settings through small-scale interventions.

An effective approach for developing a growth mindset in students is to teach

them directly that they can grow their intelligence and develop their ability. When seventh grade students were taught about the incremental theory of intelligence their motivation in school increased (Blackwell, Trzesniewski, & Dweck, 2007). Similarly, research with undergraduate college students and junior high students has demonstrated that by teaching them that intelligence can increase they were more likely to be buffered against stereotype threat and their performance in school improved (Aronson, Fried, & Good, 2002; Good, Aronson, & Inzlicht, 2003). Encouraging research also provides evidence that these types of interventions are scalable to a large number of students across schools through computer-based modules (Paunesku et al., 2015). Some of the research into mindset has found that people believe different types of intelligences are not equally malleable (Furnham, 2014). In addition to proactive interventions, reaction to behavior also has a significant effect on people's mindset.

The feedback that children receive has a direct effect on whether they develop a growth mindset or a fixed mindset. In their well-publicized study, Kamins and Dweck (1999) found that praise of effort contributed to a growth mindset while praise of ability contributed to a fixed mindset. When children believed their abilities were innate they were reluctant to risk challenges that threatened their perception of themselves. These findings were successfully applied to the feedback provided to students playing an educational video game (O'Rourke, Haimovitz, Ballweber, Dweck, & Popović, 2014). Students, especially those who were struggling, who received feedback from the computer that encouraged them to work harder were more willing than the control group to challenge themselves in the game (2014). Through their behavior, a teacher's mindset can directly affect their students' mindsets.

Since teacher mindset directly affects professional practice and student learning, the implications of developing a growth mindset in teachers are significant. Rattan, Good, and Dweck (2011) found that teachers who have a fixed mindset are less likely to help students who do not demonstrate strong performance in a course from the beginning. The effects were compounded because those instructors were likely to support a fixed mindset in their students through the type of encouragement they offered in an attempt to make the student's feel better about their poor math performance (Rattan, Good, & Dweck, 2011). By supporting a growth mindset in teachers, educators will contribute to a growth mindset in students. Research is needed into the most effective approaches to developing a growth mindset in teachers.

Although interventions with children have proven effective, there is a lack of research into developing a growth mindset in adults. In one study, teachers were instructed on neuroplasticity and were found to use more student-centered instruction as a result (Dubinsky, Roehrig, & Varma, 2013). This is an encouraging result because a teacher's mindset can affect their approach to a variety of professional practices including instruction. In addition to directly teaching people about the malleability of intelligence, there is evidence that other approaches can help people develop a growth mindset

The research into developing a growth mindset in students points to possible interventions that could help develop a growth mindset in adults. Keating & Heslin (2015) recognize mindset as a potentially significant factor in improving employee engagement. They recommend several approaches that managers can use to support a growth mindset in their employees. Their suggestions include teaching people about the malleability of intelligence and using examples where people demonstrated a

growth mindset (2015). In their article, they also state the importance of managers themselves having a growth mindset and offer additional suggestions for managers to develop their own growth mindset (2015). In accordance with existing research into teacher feedback, administrators should incorporate language that encourages a growth mindset when they provide feedback to teachers (Scheeler, Ruhl, & McAfee, 2004). For example, instead of telling teachers that they are "a master teacher" or "have a gift for teaching", which can encourage risk avoidance, feedback should focus on what they did to make their instruction effective or the progress they are making because of their efforts.

Research demonstrates that a person's mindset can change and that change has a significant impact on behavior. Although research into the mindset of teachers is limited, there is reason to believe that a teacher's mindset affects their approach to instruction and the effort they put into making innovations to their instruction. Additional research and interventions should consider how the role of mindset fits into the larger context of teacher professional development and motivation. Mindset is significant because it points to a potential avenue for helping teachers innovate their instructional practices and how leaders can support a growth mindset in teachers. To create a context where creativity and innovation in teaching is more likely to occur, leadership is required.

Literature Stream 3: Leadership for Creativity and Innovation

Leadership is an essential factor for innovation to occur in schools (Sharma, 2005). Since leaders at the district and school levels influence the climate where teachers work, they can affect the generation of novel and useful ideas by individuals and teams, as well as how innovative instructional practices are put into effect. Leadership for

innovation and creativity in schools is both about the actions of leaders and how teachers perceive those actions. Individuals and teams have different needs at different phases of the innovation process. So, the leadership that can encourage generation of creative ideas may be different from the leadership needed to put those ideas into practice. Educational leaders should be actively involved in creating the conditions where creative and innovative instruction is likely to take place and adapt their approach to meet teachers' needs as they implement innovative instructional strategies.

Adaptable Leadership

Transformational school leaders can support creativity and innovation in schools. This is consistent with the positive association that transformational leadership has on creativity and innovation in other organizations (Hu, Gu, & Chen, 2013). Research in fifty-one schools in the Netherlands found that when principals practiced transformational leadership they contributed to a school climate where teachers were more creative and innovative (Moolenaar, Daly, & Sleegers, 2010). In the more innovative schools, principals occupy a central position in the social network of the school. Since transformational leadership can encompass all aspects of a school or school district, is it is important for leaders to focus on instructional leadership as well. Marks and Printy (2003) argue for the integration of transformational leadership, including an interest in innovative ideas, and shared instructional leadership to have the greatest impact on teacher behavior and school performance. To be most effective, leaders need to adapt their approach to the individuals, the situation, and the stages of the innovation process.

Leaders need to apply different approaches depending on the type of work that needs to be accomplished and the phase of the creativity and innovation process. According to Oke, Munshi, and Walumbwa (2009) transformational leadership can support creative thinking and the generation of innovative ideas, whereas transactional leadership may be more appropriate for assisting the implementation of innovative ideas. They argue that transactional leadership may be most appropriate when the innovations do not replace existing products or services and transformational leadership may be more appropriate when the innovation is more radical. Beyond transformational leadership, there is some early research evidence that leaders who can both help teams develop creative approaches and then take specific actions to put innovations into place are most effective at supporting innovation (Zacher & Rosing, 2015).

Leaders must be able to manage individuals who are innovating in diverse ways. Puccio, Mance, & Murdock (2011) stress the important effect that psychological diversity can have on creativity. They caution against minimizing the contributions of people who make incremental improvements relative to those people who make more dramatic changes since effort in both those areas have value. Similarly, Ekvall (1997) cautioned that the structure of an organization can stifle people who prefer more radical innovation at the same time it supports people who support more incremental innovation. Leaders not only need to consider how individual preferences for innovation may differ, but also individual strengths during different phases of innovation.

Leaders should consider how people's needs may change depending on the stage of the creative process. IDEO has developed a design thinking approach to develop innovative solutions for a variety of organizations including school districts. There are

five phases to IDEO's (2012) Design Thinking for Educators process: 1) Discovery, 2) Interpretation, 3) Ideation, 4) Experimentation, and 5) Evolution. The first three phases encompass the creative process of understanding the challenge, interpreting the challenge, and developing ideas. The last two phases encompass the innovative process of testing a prototype and developing it after it is put into practice. A challenge for leaders is how to support people with preferences for different phases of innovation with an organization's structure.

Reiter-Palmon and Illies (2004) suggest ways that leaders can facilitate the idea generation and idea evaluation processes. To encourage idea generation, leaders should make information available and encourage it to be shared. Furthermore, leaders should prioritize problems so people can dedicate their time to solving the most important ones. Other research has also found evidence that time pressure had a negative effect on creativity (Amabile, Mueller, Simpson, Hadley, Kramer, & Fleming, 2002). Therefore leaders should allow time for individuals and teams to be creative. Finally, according to Reiter-Palmon and Illies (2004), leaders should clearly communicate whether they would like either original or numerous potential solutions to problems. For idea evaluation, leaders must also communicate clear goals. They must also foster an open climate where ideas are developed constructively.

Since people have preferences in the process of forming and implementing creative ideas leaders may need to support these people in different ways (Puccio, Mance, & Murdock, 2011). The need for different types of leadership during different phases of innovation exists in schools. Sharma (2005) found that innovation was supported by a principal who shielded teachers from external criticism and gave support for

experimentation in the initial phases of innovation and then served to facilitate and coordinate the innovation where it was established. Leaders may need to help people appreciate those stages of the creativity process where they are less comfortable and apply the appropriate principles and tools when they are there. To do this well, leaders need to be aware of their biases and preferences in the creative process. This will help them to interact more effectively with people and create an environment to support the innovative activities of the people they work with (Puccio, Mance, & Murdock, 2011). Effective leadership for innovation requires leaders to create the conditions where innovation can occur. Beyond the direct actions of leaders, the environment that leaders cultivate will also affect creativity and innovation.

Indirect and Direct Support for Creativity and Innovation

Leaders need to support both the indirect and direct conditions that allow for creativity and innovation in the workplace. Mumford, Scott, Gaddis, and Strange's (2002) review of the literature led them to the preliminary conclusion that leaders should practice an integrative style where they "orchestrate expertise, people, and relationships in such a way as to bring new ideas into being" (p. 738). Their analysis found that leaders must help people generate creative ideas, set a broad structure for the creative work, and promote the creative ideas within the organization. These creative ideas are generated and supported within the culture of the organization.

Leaders indirectly influence the creativity and innovation of others through the climate of the organization. Since leaders have a significant influence over the culture of the organization, it is important that they affirmatively support innovative practice. Leaders must value innovation and make it clear that risk-taking is desirable (Friedrick,

Stenmark, & Mumford, 2011). Principals should support a learning culture in their schools where teachers generate and share knowledge (McCharen, Song, & Martens, 2011). The climate that fosters creativity and innovation must be a safe place for original ideas and risk taking. Vijay Govindarajan refers to the emotional climate within an organization as “emotional infrastructure” (Leavy, 2011). Govindarajan believes that a strong emotional infrastructure of an organization contributes to innovation by encouraging productive dialogue between people. Leaders can directly contribute to emotional health of an organization and the climate where creative ideas and innovations may develop.

One of the ways that leaders create conditions for innovation is through the development of teams that can generate and implement creative ideas. To do this, leaders need to cultivate the appropriate mindsets and behaviors that are likely to lead to innovations. Kelley and Littman (2005) emphasize the importance of establishing a culture of innovation. They describe how individuals working in and across teams can play different roles that contribute to learning, organizing, and building in a culture of innovation. Teaming in schools can be difficult, especially in high schools, since teachers do much of their work in isolation. High schools are still predominately organized by academic department (e.g. English, mathematics, social studies, art) and teachers do most of their work in isolation.

Additionally, leaders can use specific behaviors and techniques to help people generate creative ideas. Leaders should demonstrate the behavior they want to encourage. Leaders who model creativity can increase the creativity of their followers (Shalley & Perry-Smith, 2010). Leaders can also use strategies to encourage creativity. Leaders who

employed the provocation technique were able to help people produce high qualitative creativity even if they did not have a transformational leadership style (Herrmann & Felfe, 2014). The provocation technique basically asks people to challenge their assumptions by considering drastic alternatives to what they take for granted. Research also suggests that leaders can help people generate creative ideas by helping them take the perspective of people they serve (Grant & Berry, 2011). For teachers this means taking the perspective of students in their classes and considering the instruction that will be most useful for them. Beyond these techniques, leaders affect creative and innovative practices through their use of rewards.

In their research of employees of manufacturing organizations, Baer, Oldham, and Cummings (2003) found that extrinsic rewards were negatively related to the creativity of employees who were engaged in complex tasks. The creativity of innovative people who were involved with complex jobs was unaffected by an increase in extrinsic rewards whereas the creativity of innovative people engaged in simple jobs showed lower creativity. Their research also found that creativity of adaptive people engaged in complex jobs also decreased as extrinsic rewards increased. Sue-Chan and Hempel (2016) researched the effect of rewards on each of the components of creativity: novelty and usefulness. They found that rewarding creativity supports novelty and erodes usefulness. The extrinsic reward changed the employee's emphasis from the usefulness to the novelty of their work. How leaders' actions are perceived can have a significant effect on creativity and innovation.

Leadership can affect creativity by affecting motivation. Research has shown that goals can motivate people and help them focus their attention on being more creative so

leaders can help people set clear goals that require creativity and evaluate them on those goals (Shalley, 1995). Shalley & Perry-Smith (2001) conducted a study in a controlled environment and found that people who perceived their evaluation to be informative for the purpose of improving their performance were more intrinsically motivated and more creative than people who perceived their evaluation to be controlling. Informative evaluations allow employees to maintain control and have freedom to generate new ideas. Leaders who want to cultivate creativity and innovation should emphasize the importance of learning and working towards improvement.

Perceptions of Leadership to Supporting Creativity and Innovation

The perceptions that people have about leaders in their organization can affect their level of creativity. Amabile, Schatzel, Moneta, and Kramer (2004) gathered detailed longitudinal data from 238 workers in seven companies and found that their perceptions of leadership support had a significant effect on their creativity. Employees felt supported by their leaders who engaged in behaviors such as keeping them informed, reducing stress, providing guidance, providing constructive feedback, asking for input, and recognizing good performances in public and private. On the other hand, employees did not feel supported by leaders who created time pressures, gave inappropriate, unclear, or conflicting assignments, checked on employees too frequently, did not take an interest in employee's work, or avoided solving problems. This suggests that leaders need to work and communicate with their followers in supportive ways but not so involved that they would be considered micromanagers. People's relationships with their leaders also affect their creativity and innovation.

The perception of leader's moral behavior can empower followers to be creative. Ethical leadership, where leaders are honest, trustworthy, and demonstrate concern for people, can contribute to employee's creativity (Ali Chughtai, 2014). When followers feel empowered by their leaders they demonstrate more creativity (Zhang & Bartol, 2010). Similarly, when people perceive their leader to be authentic, they are more likely to be creative and innovative (Černe, Jaklič, & Škerlavaj, 2013). This authenticity results in a trusting environment were risk-taking is allowed, and mistakes are accepted as part of the learning process. Leaders should monitor not only their behaviors but also how those behaviors are perceived by those they lead.

Summary

Teachers are more likely to make innovations to their instructional practices when they have individual traits that support creative and innovative behavior and are supported by organizational factors and leadership. Significant improvements to classroom practice will take place when teachers persevere through the challenges they encounter while developing innovative instructional practices and putting those practices into place in their classrooms. A growth mindset will allow them to enhance their abilities and adapt their practices for the benefit of the students in their classrooms. Effective leadership for creativity and innovation should be multifaceted and flexible to support innovative practices while they are being developed and when they are being put into place. The design of this study will investigate how teachers themselves describe how they experience making innovations to their instructional practices. The research methodology is presented in the next chapter.

Chapter 3: Research Methodology

Introduction

Theories of creativity and innovation are useful but schools are constructed through human interaction so it is important to understand the lived experiences of teachers. The purpose of this mixed-methods study is to reveal how teachers experience making innovations to their instruction. Individual teachers have subjective views of the phenomenon of making innovations to their instruction that have been affected by multiple influences over their lifetimes and careers. These views affect their professional practices. The mixed-methods approach allows for expansion of the inquiry into teachers' experiences by including quantitative data that identifies teachers' self-assessment of their own creativity and mindset. The qualitative portion of this study is suited to surface themes that help to describe the phenomenon of making innovations to instruction. Included in teachers' experiences are their perceptions of the environmental and leadership factors that affect innovations to their instruction. This research study is designed to answer the following research questions:

1. What key themes emerge as teachers describe their experiences making innovations to instruction?
2. What key themes emerge as teachers describe the environmental factors that influence the innovations they make to instruction?
3. What key themes emerge as teachers describe the leadership that influences the innovations they make to instruction?

This chapter will introduce the research design and rationale, describe the site and population, describe the research methods, and summarize the protection of participants' rights.

Research Design and Rationale

This mixed methods research design collects quantitative data but qualitative data is dominant. The quantitative portion of the study expanded the scope of the study by gathering data on teachers' self-assessment of their creativity and mindset. This information provides a profile of participants that is not easily acquired through qualitative means. The qualitative portion of this study used focus group and individual interviews to reveal how high school teachers experience making innovations to their instruction. Together this research design provides insight into how teachers experience making innovations to their instruction.

The qualitative portion of the study was conducted using a phenomenological approach. The phenomenological approach was appropriate because it seeks to reveal the essence of an experience by exploring the participants' perspectives of that experience (Moustakas, 1994). Phenomenology has its roots in the philosophy of Edmund Husserl who emphasized knowledge through recognition that the world is not separate from consciousness (1994). Phenomenology recognizes the intertwined relationship between the subject and object and can be used to reveal the essence of innovative instruction as high school teachers experience it in the world (1994). This study attempts to describe the experience of innovating instruction by identifying categories, subcategories, and themes that reveal the essence of innovative instruction based on teachers' perspectives.

In order to make decisions that support innovative instructional practices, it is helpful for educators to understand the experiences of the teachers who most directly affect the use of those practices. Van Manen argues that phenomenology can help practitioners understand the non-cognitive aspects of professional practice (2007). Van Manen goes on to explain that phenomenology can contribute to professional practice by helping to develop the "thoughtfulness required in contingent, moral, and relational situations" (2007, p. 21). Specifically with regard to education, van Manen states, "the end of human science research for educators is a critical pedagogical competence: knowing how to act tactfully in pedagogic situations on the basis of carefully edified thoughtfulness" (1990, p. 8). This phenomenological research study helps educational practitioners develop their understanding of the experience of teachers who make innovations to their instruction. In turn, educational leaders can use this understanding to make informed decisions about how best to support new and valuable instructional approaches.

Site and Population

Population Description

The population for this research study was a purposeful sample of teachers from three high schools in Pleasant View School District (pseudonym) who were identified because they make innovations to their instruction. The teachers are regular education teachers in core subject areas (math, English, science, and social studies). The study was limited to core content area teachers because they teach as a member of an academic department. Multiple members of the department often teach the same courses and have similar expectations placed upon them from administrators, teachers, parents, and

students. These expectations include pressures to teach similar content at a similar pace and have similar expectations for students. In Pleasant View School District these expectations are written into curriculum documents and students in required cores courses must complete the same common assessments and take the same final exam in each classroom across all three schools. Participants were not selected based on demographic characteristics such as age, gender, race, or years in education but demographic information was collected from participants.

The principal and assistant principals in each of the three high schools and the Director of Technology and Innovation for Pleasant View School District were invited to identify participants for the study using a screening device (Appendix D). These administrators were asked to identify teachers based on the following criteria: (1) All teachers should currently teach in core content areas (English, mathematics, science, or social studies). (2) The teachers should be identified based on a definition of innovative instruction adapted from Zhu, Wang, Cai, and Engels (2013): Use of new ideas, methods or strategies and activities by teachers to improve the teaching and learning processes. These teachers may or may not be the original creator of the instructional practice they put into place. (3) The teachers should also demonstrate many of the following characteristics that contribute to teachers' innovative behavior identified by Thurlings, Evers, and Vermeulen (2015) based on their review of the literature:

1) Personality
    - Curiosity
    - Openness to change
2) Traits

- Attitudes and beliefs that support innovation
- Intrinsic motivation
- Learning goal orientation: intentionally learns new skills and how to complete more complex tasks.
- Self-efficacy: confidence in ability to meet challenges
- Persistence/perseverance
- Other: humor, job satisfaction

3) Competence

- Develop specific competencies needed for teaching
- Problem solving
- Recognize and evaluate opportunities worth pursuing
- Content knowledge of teaching

Principals in two of the three high schools and the Director of Technology and Innovation participated. Principals in Pleasant View High School 3 did not participate. The principals and the Director of Technology and Innovation identified a total of thirty individual teachers from all three high schools who were then invited to complete the self-assessment questionnaires. Twenty-one teachers completed the self-assessment questionnaire and each of these teachers was invited to participate in a focus group interview. Those who were not available to participate in a focus group were invited to participate in an individual interview. Eight teachers participated in one of two focus group interviews and six teachers participated in individual interviews. The total of fourteen teachers is consistent with both Creswell and Morse's recommended sample size for phenomenological research as reported in Onwuegbuzie & Collins (2007).

At the end of each interview teachers were invited to identify innovative teachers using the same criteria as administrators. The additional teachers, identified through this snowball sampling, may have been invited to participate in the study if enough participants identified by administrators were not willing or able to participate. This information also showed whether the teachers identified by administrators were recognized as innovative by some of their teaching colleagues.

Site Description

Pleasant View is a large suburban school district in the northeast region of the United States. The school district is in an affluent area and parents tend to value education. The high schools in Pleasant View are regularly recognized by national publications for their high school students' achievement scores. Their state assessment scores are among the highest in the state. The graduation rate is 99% with 92% of students going to a two or four-year college. The high schools are comprised of grades 10-12. Student enrollments in the high schools are approximately 1450, 1650, and 1800 students.

Each high school is divided into academic departments and has a block schedule. Classes are scheduled into four 90-minute blocks each day. High school teachers teach three classes a day and have one planning period. The same course taught in each of the three high-schools is based on the same written curriculum and students across all three school are administered the same district-wide core assessments. Changes to curriculum and core assessments are made at the district level, not the school level. Teachers are involved in developing the curriculum and common assessments. Core assessment scores are factored into final course grades and are included on students' report cards.

Each high school has one principal and three assistant principals. There are a variety of district-level administrators including an Assistant Superintendent for Secondary Education, K-12 subject-area Supervisors, and a Director of Technology and Innovation. There have been several recent changes in administration in Pleasant View School District. Both the Superintendent and the Assistant Superintendent for Secondary Education are in their first year in those positions. The principal in each high school is also new to their schools although they had been principals in different schools in the district before this year. Several of the assistant principals have been in their positions for less than three years. The Director of Technology and Innovation is a position that was just created this year although the person holding that position had been working in a K-12 administrative position in Pleasant View School District before assuming that role.

Site Access

Administrators in Pleasant View School District were supportive of the research study and provided the researcher with access. The researcher secured written permission from the Assistant Superintendent for Secondary Education to conduct research in the school district (see Appendix C). The researcher emailed each of the high school principals, assistant principals, and the Director of Technology and Innovation to request the names of teachers who meet the criteria (see Appendix D). The researcher then emailed those teachers who were identified to invite them to participate in the study (see Appendix E). Follow-up emails were sent to administrators and teachers who did not respond to the initial request. The invitation letters introduced the study, informed participants that data gathered from the study will be kept confidential, and provided information about the data collection methods.

Research Methods

Descriptions of Each Method Used

Data from teachers for this study was collected through the use of the Reisman Diagnostic Creativity Assessment (RDCA) self-assessment, Dweck's mindset questionnaire, focus group interviews, and individual interviews. The self-assessments consist of a total of sixty-four items that took approximately 15 minutes to complete. The focus group interviews lasted 70-90 minutes each. Individual interviews lasted 20-50 minutes each.

Self-assessments: The RDCA self-assessment and Dweck's mindset questionnaire were administered via Qualtrics to all teachers who participated in the study. The questionnaire also included questions to gather demographic and background information (see Appendix A). Teachers completed the questionnaire prior to the focus groups or individual interviews.

The RDCA is a self-assessment that consists of 40 Likert-type scale items designed to measure an individual's self-perception on the following creativity factors: originality, fluency, flexibility, elaboration, tolerance of ambiguity, resistance to premature closure, convergent and divergent thinking, risk taking, intrinsic and extrinsic motivation. Each Likert-type scale answer was weighted 1 to 6 to provide an overall RDCA score for each participant. A score of 204-240 indicates a self-assessment classification of Very High creativity; a score of 144-203 indicates a classification of Moderately High creativity; a score of 120-143 indicates a classification of Average creativity; a score of 96-119 indicates a classification of Low creativity; and a score of 0-95 indicates a classification of Very Low creativity.

The RDCA is available as a free app and it offers a quick and inexpensive alternative to the Torrance Tests of Creative Thinking (TTCT) (Reisman, Keiser, & Otti, 2016). The RDCA has content validity because it has been reviewed by experts in the field of creativity research and it is based on the Torrance Tests of Creative Thinking. The author of the RDCA and two of her colleagues (2016) found that there is a significant correlation between the overall score on the RDCA and the overall score on the TTCT. This also indicates that there is concurrent validity to the measure. Reisman and her colleagues (2016) also found that the Cronbach's coefficient alphas for seven out of eleven of the RDCA assessment items are acceptable to good: originality (.93), extrinsic motivation (.89), fluency (.87), tolerance of ambiguity (.77), divergent thinking (.67), elaboration (.66), and flexibility (.65). This shows there is internal consistency and reliability to the instrument.

Dweck's mindset questionnaire consists of 16 Likert-scale items designed to measure whether an individual is oriented towards a growth or a fixed mindset. Dweck makes the mindset questionnaire available to anyone free online ("Test Your Mindset," n.d.). The responses from participants were entered into the online mindset questionnaire to indicate whether participants have mostly a growth mindset, a mixed mindset, or fixed mindset. Also, each Likert-scale answer was weighted 1 to 6 to provide an overall mindset score for each participant. A higher score indicates more of a growth mindset and a lower score indicates more of a fixed mindset.

Focus Group Interviews: Semi-structured focus groups were one of the primary methods for gathering data for this study. The researcher explained the purpose of the interview to participants and reminded them of their rights. The researcher scheduled two

focus groups based on the availability of participants. The first focus group was scheduled to have six participants but two were unable to attend. The second focus group also had four participants. The focus group interviews lasted 70-90 minutes. The questions were aligned with this study's research questions and they encouraged teachers to share their experiences with innovative instruction (see Appendix B). The researcher asked follow-up questions as needed. The researcher facilitated the focus groups so participants could express their thoughts without letting anyone dominate (Onwuegbuzie & Leech, 2007). The focus group interviews were audio recorded and the researcher took notes. After the interviews, the recordings were transcribed to allow for coding and analysis.

Individual Interviews: Semi-structured individual interviews were the other primary method used to gather data for the study and validate emerging themes. The researcher scheduled six individual interviews with teachers who were not available to participate in a focus group. Interviews were scheduled based on the availability of participants. The researcher explained the purpose of the interview to participants and reminded them of their rights. The researcher asked the same questions that were used with the focus groups and asked follow-up questions as needed. Individual interviews lasted 20-50 minutes. The individual interviews were audio recorded and the researcher took notes. After the interviews, the recordings were transcribed to allow for coding and analysis.

Data Analysis Procedures

The results of the questionnaire were imported into SPSS to assist with tabulation and analysis of the quantitative data. Descriptive statistics for the RDCA and mindset

questionnaire provide a profile of teachers' collective perceptions of their creativity and mindset. The Pearson's correlational coefficient for creativity and mindset was also calculated and a scatterplot was generated. The results of the RDCA self-assessment and Dweck's mindset questionnaire are reported for the 14 teachers who participated in interviews. Next, the qualitative data was analyzed.

The research used a whole-part-whole approach to analyze the transcripts of the focus groups and individual interviews (Vagle, 2014). The researcher read the transcripts to become familiar with the data. The researcher coded the transcripts from the focus groups and individual interviews using the first cycle coding methods of descriptive coding and in vivo coding (Saldaña, 2013). The researcher identified individual aspects that comprise the phenomenomon of innovative teaching from the perspective of teachers. Through this process of horizontilization, the character of the phenomenon began to emerge (Moustakas, 1994). The codes were analyzed to identify major categories and subcategories regarding teachers' experiences making innovations to their instruction. This process includes the elimination of vague and overlapping terms (Moustakas, 1994). The researcher reviewed the transcripts again to ensure these concepts were supported by the data.

Phenomenology requires rich-thick descriptions of the participants' experiences. van Manen (1990) identifies the following guidance for writing these descriptions:

> (1)You need to describe the experience as you live(d) through it. Avoid as much as possible causal explanations, generalizations, or abstract interpretations…
>
> (2) Describe the experience from the inside, as it were; almost like a state of mind: the feelings, the mood, the emotions, etc.

> (3) Focus on a particular example or incident of the object of the experience: describe specific events, an adventure, a happening, a particular experience.
>
> (4) Try to focus on an example of the experience which stands out for its vividness, or as it was the first time.
>
> (5) Attend to how the body feels, how things smell(ed), how they sound(ed), etc.
>
> (6) Avoid trying to beautify your account with fancy phrases or flowery terminology. (pp. 64-65)

This guidance was used when writing the descriptions of teachers' experiences and selecting quotes. Foremost, the researcher tried to represent the experiences of teachers as they shared them during the interviews.

In order for the experience of innovating instruction to be determined, it is necessary for the researcher to imagine various meanings and perspectives of the phenomenon (Moustakas, 1994). The final step is to distill the essence of the experience of innovative teaching with full realization that this will not be completed in this study or any study (Moustakas, 1994). In doing so it was necessary to for the researcher to avoid imposing order that is not present in the experiences that participants share (Giorgi, 2005). Through this process the researcher answered the research questions regarding the experiences that teachers have making innovations to their instruction.

Stages of Data Collection

In winter of 2017, the researcher contacted principals and assistant principals in each of Pleasant View School District High Schools and the Director of Technology and Innovation for Pleasant View School District to ask them to identify high-school teachers in the core content areas who made innovations to their instruction. Those administrators

who did not respond to the initial invitation were sent a follow-up email inviting them to participate.

Principals from two of the three high schools and the Director of Technology and Innovation responded with the names of thirty teachers. The researcher sent an email to all thirty teachers to introduce the research study and invite them to participate in the first phase by completing the demographic information and self-assessment questionnaires via a link to Qualtrics. One reminder was sent to each teacher who did not respond to the questionnaire. Twenty-one teachers completed the demographics and background, creativity, and mindset questionnaire.

All twenty-one teachers who completed the survey were invited to participate in phase two of the research study. They were asked to use an anonymous Doodle to identify dates and times when they were available to participate in focus group interviews. One follow-up email was sent to each teacher who did not respond to the phase two invitation. Those teachers who were not available on the most popular focus group dates were invited to participate in individual interviews. The date, time, and location of interviews were confirmed with participants via email.

The researcher used a journal to help bracket preconceived ideas about teachers' experiences innovating their instruction. Moustakas (1994) identifies a process for phenomenological studies that begins with the Epoche, continues into Phenomenological Reduction, incorporated Imaginative Variation, and ends with synthesis to determine the underlying structure of the phenomenon. In the Epoche, the researcher goes through the process of bracketing which requires "setting aside predilections, prejudices, predispositions, and allowing things, events, and people to enter anew into consciousness,

and to look and see them again, as if for the first time" (Moustakas, 1994, p.85). Although it is difficult, if not impossible, for the researcher to completely bracket their experiences and thinking, prior to the interviews the researcher wrote in a journal about their preconceived notions to bring them to the surface and allow them to be considered.

The researcher conducted two focus groups consisting of four teachers each and six individual interviews. The interviews and focus groups were conducted in teachers' classrooms at Pleasant View High School 1 and Pleasant View High School 2. Interviews were transcribed and read multiple times. These transcripts provide a useful source of data about the lived experiences of 14 high-school teachers who make innovations to their instruction. The researcher conducted a holistic reading of each transcript. The researcher then conducted line by line readings and used the first cycle coding methods of descriptive coding to identify topics and in vivo coding to hightlight verbatim words and phrases. The researcher organized the codes into categories and subcategories (Saldaña, 2013). These categories and subcategories were then developed into themes that are presented in the results. See Figure 2 for the data collection and interpretation timeline.

Date	Activity	Details
November-December 2016	Submit IRB	• Get letter of approval letter from Assistant Superintendent in participating school district • Complete IRB paperwork
January 2017 (upon IRB Approval)	Secure Participants	• Email invitation letter with criteria to principals and Director of Technology and Innovation • Email Invitation Letter with questionnaire link to Identified Teachers • Follow-up as needed
February 2017	Schedule Focus Groups and Individual Interviews	• Send questionnaire to participating teachers • Determine availability for focus groups using Doodle • Schedule focus groups and individual interviews via email
March 2017	Conduct Interviews	• Import questionnaire results into SPSS and conduct analysis • Conduct focus group interviews • Conduct individual interviewers • Audio Recording • Use field journal • Verbatim Transcription
April-May 2017	Data Analysis	• In vivo and Descriptive Coding • Identify categories, subcategories, and themes
May-July 2017	Writing	• Identify Findings • Interpretations • Conclusions • Recommendations

Figure 2. Data Collection Timeline

Ethical Considerations

Research using human subjects must guarantee that participants' basic rights are not violated as part of the research. This study presented limited risks to participants and it contributes to our understanding teacher's experiences making innovations to their instruction. The study adhered to the American Educational Research Association Code

of Ethics. The benefits resulting from a study outweighed the risks resulting from the study. This study was approved expedited by Drexel University's Institutional Review Board.

Participants received an informed consent form to provide active consent prior to the focus group or individual interviews. Since this study only involves adults, participants were capable of providing consent for themselves. The informed consent form specified the purpose of the study; identified that there are no known risks or benefits to participants; assured participants that their information will be kept confidential; let participants know who they may contact with questions about the study or their rights; and stated that participation is voluntary and they may discontinue their participation at any time. All participants were treated with respect at all times.

Since teachers shared information about their professional practice, it was important to ensure that their participation has no negative impact on their evaluation or employment. No data attributable to an individual is published in this study. Recommendations are made in the aggregate and individual identities are protected. All information collected as part of the study was treated as confidential and will remain confidential after the study has been concluded. The findings, results, and interpretations of this study are presented in the next chapter.

Chapter 4: Findings, Results, and Interpretations

Introduction

The purpose of this mixed-methods study is to reveal how teachers experience making innovations to their instruction. This study seeks to contribute to the substantial research on creativity and innovation by adding the voices of innovative teachers currently working in schools. Quantitative data for this study was collected from 21 teachers through the use of the Reisman Diagnostic Creativity Assessment (RDCA) self-assessment and Dweck's mindset questionnaire. Qualitative data was collected from 14 of teachers through focus groups and individual interviews. This chapter provides the findings of the study, including major categories and subcategories from the interviews, and themes presented as results with interpretations.

Principals from two of the three high schools in Pleasant View School District and the Director of Technology and Innovation used a screening device and provided with the names of thirty teachers who demonstrate characteristics of innovative teachers. Four of those teachers were identified by both their principal and the Director of Technology and Innovation. The principals of the two high schools who participated in the study also provided the total number of teachers in each of the core content areas in their school. This allowed for the calculation of the percentage of core content area teachers that administrators identified as making innovations to their instruction (see Table 1). Since the principals from Pleasant View High School 3 did not participate the percentage was not calculated for that school.

Table 1

Identified Teachers by School and Content Area

Pleasant View High School 1

Core Content Area	Number of Teachers in the Department	Number of Teachers Identified by Principals	Number of Teachers Identified by Director of Technology and Innovation	Number (percentage) of Individual Teachers Identified by Administrators
English	13	2		2 (15.38%)
Mathematics	14	3	1	4 (28.57%)
Science	12	3	2	3 (25%)
Social Studies	13	3	1	4 (30.76%)
Total	52	11	4	13 (25%)

Pleasant View High School 2

Core Content Area	Number of Teachers in the Department	Number of Teachers Identified by Principals	Number of Teachers Identified by Director of Technology and Innovation	Number (percentage) of Individual Teachers Identified by Administrators
English	15	3	1	3 (20%)
Mathematics	17	4	1	4 (23.52%)
Science	16	4		4 (25%)
Social Studies	14	4		4 (28.57%)
Total	62	15	2	15 (24.19%)

Pleasant View High School 3

Core Content Area	Number of Teachers in the Department	Number of Teachers Identified by Principals	Number of Teachers Identified by Director of Technology and Innovation	Number (percentage) of Individual Teachers Identified by Administrators
English			1	1
Mathematics				
Science				
Social Studies			1	1
Total			2	2

A total of 14 teachers from all three high schools and the four core content areas participated in focus groups or individual interviews (see Table 2). The teachers cooperated during the interviews and openly shared their experiences with the researcher. They answered all questions that were asked although some of the participants provided more detailed explanation than others. At the end of the interview several teachers expressed that they enjoyed the opportunity to talk about their practice. After each interview, teachers were invited to identify innovative teachers based on the same criteria that were used by administrators. They identified a total of 18 core content area teachers, including 11 teachers who were not identified by administrators.

Table 2

Teachers Who Participated in Interviews

Pseudonym	Identified By	School	Subject Taught	Years Teaching	Gender	RDCA Score	Mindset Score	Format
Angela	DI	PVHS 3	Social Studies	16-20	F	Mod. High (194)	Fixed (40)	Focus Group
Eleanor	P and T	PVHS 1	English	21-25	F	Mod. High (226)	Growth (79)	Indiv.
Elizabeth	P and DI	PVHS 2	English	11-15	F	Mod. High (195)	Growth (71)	Indiv.
Elon	P and DI	PVHS 2	Math	11-15	M	Mod. High (175)	Growth (76)	Focus Group
Gloria	P and T	PVHS 1	Social Studies	11-15	F	Very High (204)	Growth (96)	Indiv.
Helen	DI and T	PVHS 1	Math	11-15	F	Mod. High (163)	Fixed (55)	Indiv.
Jane	P and T	PVHS 1	Math	11-15	F	Mod. High (180)	Growth (77)	Focus Group
Jeff	DI	PVHS 1	Social Studies	Less than 5	M	Mod. High (177)	Growth (62)	Focus Group
Julia	P	PVHS 2	Science	11-15	F	Average (128)	Growth (64)	Focus Group
Larry	P and T	PVHS 1	Social Studies	21-25	M	Mod. High (201)	Growth (94)	Focus Group
Paul	P and DI	PVHS 1	Science	16-20	M	Mod. High (197)	Growth (68)	Focus Group
Steve	P	PVHS 2	Science	21-25	M	Mod. High (175)	Growth (74)	Focus Group
Tim	P	PVHS 2	Science	11-15	M	Mod. High (194)	Mixed (57)	Indiv.
Walt	P	PVHS 2	English	16-20	M	Mod. High (167)	Growth (65)	Indiv.

Note. DI = Director of Innovation; P = Principal; T = Teacher

Findings

A total of 21 of the 30 teachers (70 percent) identified by administrators completed the self-assessment questionnaire. 10 are female and 11 are male. Twenty identified themselves as Caucasian/White and one preferred not to answer that question. The survey results show that the innovative teachers who participated in the survey were not new to teaching: 66.7 percent of the teachers were mid-career, having between 11 and 20 years of experience; 85.7 percent of the teachers who took the survey had over 10 years of teaching experience (see Table 3).

Table 3

Years of Teaching Experience

Years	Frequency	Percent
Less than 5	1	4.8
5-10	2	9.5
11-15	8	38.1
16-20	6	28.6
21-25	3	14.3
More than 25	1	4.8
Total	21	100.0

The descriptive statistics for the RDCA and Mindset questionnaire are presented in Table 4. Since the Mean and Median are close for the RDCA the distribution is close to symmetrical. The standard deviation for the RDCA is 21.14 points. The RDCA scores indicate that 16 teachers rate themselves in the Moderately High creativity range and four teachers rate themselves in the Very High creativity range. One teacher was an outlier on the RDCA with a score of 128 points.

Since the Mean and Median are nearly equal for the Mindset questionnaire, the distribution is symmetrical. The standard deviation for the mindset questionnaire is 14.13 points. The Mindset questionnaire responses indicate that indicate that 18 participants have a growth mindset, one participant has a mixed mindset, and two have a fixed mindset. One of the participants with a fixed mindset was an outlier on the Mindset questionnaire with a score of 40 points.

Table 4

Descriptive Statistics for RDCA and Mindset

	RDCA	Mindset
N	21	21
Mean	188.8095	71.5238
Median	194.0000	71.0000
Std. Deviation	21.14384	14.13372
Range	98.00	56.00
Minimum	128.00	40.00
Maximum	226.00	96.00

The scatterplot shows the relationship between creativity as measured by the RDCA and mindset as measured by the Mindset questionnaire (see Figure 3). The points are not clustered and there is only a slight positive slope. The form of the scatterplot does not show a strong association between the variables.

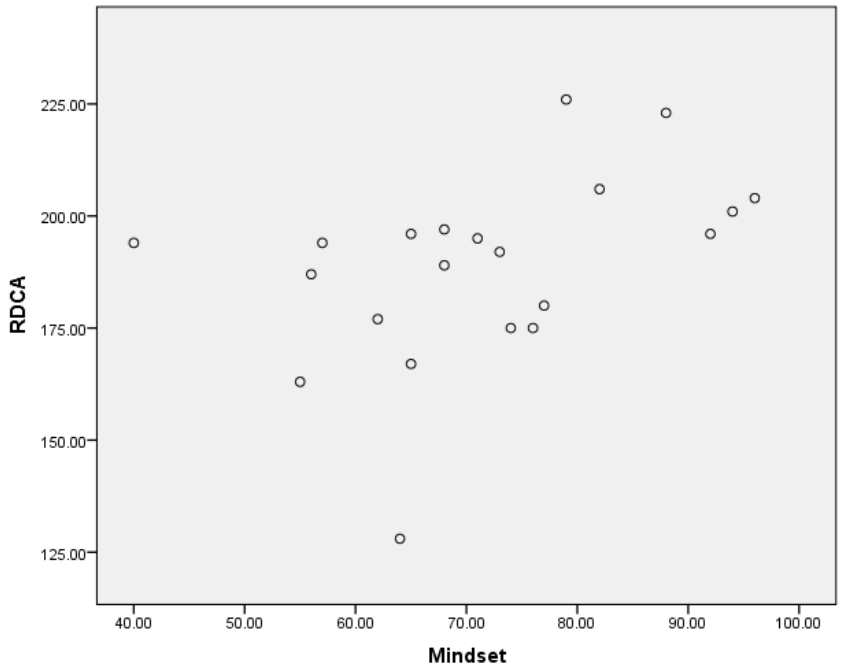

Figure 3. Scatterplot for RDCA and Mindset

For the RDCA and Mindset self-assessments, the correlation coefficient is .422. This shows there is a moderate, positive correlation between the variables. The two-tailed P value equals 0.057. Since correlation is significant at 0.05, the correlation is not quite statistically significant (see Table 5).

Table 5

Correlation between RDCA and Mindset

		RDCA	Mindset
RDCA	Pearson Correlation	1	.422
	Sig. (2-tailed)		.057
	N	21	21
Mindset	Pearson Correlation	.422	1
	Sig. (2-tailed)	.057	
	N	21	21

Innovative Practices

The examples of innovative instruction that teachers provided primarily focused on learning activities and often resulted from a specific need. Teachers in the study identified changes they made to individual lessons and some spoke in general about changes to units or an entire course. Examples of the innovations teachers identified in the questionnaire include using post-it notes to share and review research questions in a social studies class; giving more choice to students about what topics to study in physics; using Doodle Notes to help students learn math vocabulary; and asking English students to organize examples of literary archetypes from popular culture on the classroom wall. These changes in practice were new to the teachers who used them but were not new to the teaching profession.

Some of the teachers use technology to be innovative in their classrooms. In the questionnaire, 47% of the respondents identified an innovation they made to their instruction that specifically used technology. During the interviews, teachers gave examples of using technology including Edmodo, Google Classroom, Microsoft OneNote, and 1:1 computers to improve their efficiency and communication as teachers. In a focus group, teachers also discussed that easy access to information through technology has changed society and is a reason that schools should change what they teach students. Some teachers also expressed that technology is often conflated with innovation but they do not regard technology and innovation as one in the same. One teacher specifically stated they were glad to see the interview questions focused on innovative instruction and not technology.

The researcher coded the interview transcripts. From the codes, the research identified major categories and subcategories (see Figure 4). These categories and subcategories are explained below with quotes from participants.

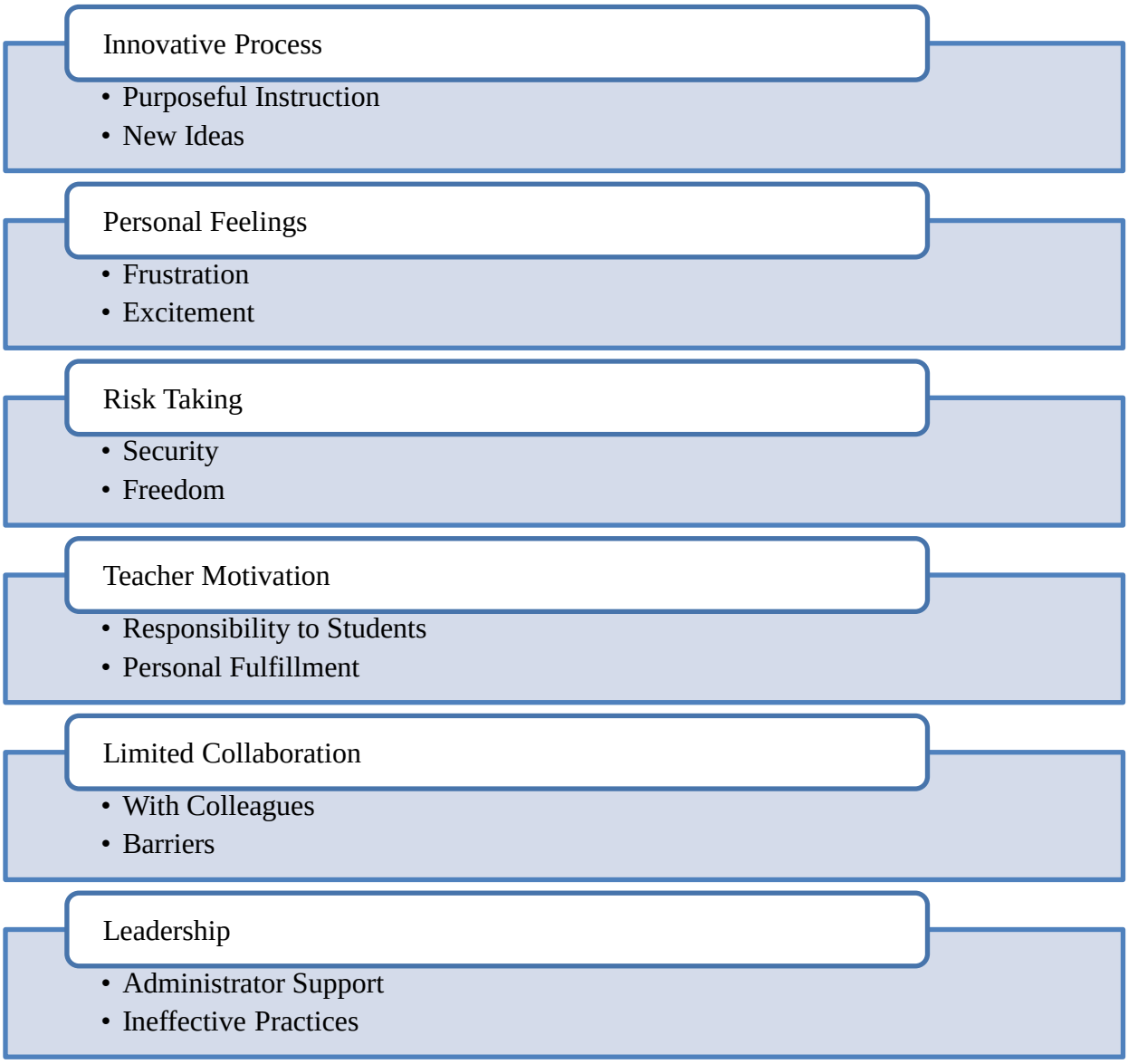

Figure 4. Major Categories and Subcategories

Category 1: Innovative Process

The teachers who participated in this study regard innovative instruction as coming up with new ways to achieve their curricular objectives and engage students. One of the participants specifically said that innovative practices do not have to be ones that no one has used before. The teachers sought new instructional practices and were open to ideas wherever they may come from.

Purposeful Instruction. The teachers in this study think often about their classes and are purposeful about their approach to instruction. Elizabeth described starting her process for developing her instruction by thinking about her students and how they present themselves as a class. She then considers the content she wants to teach and develops activities to get her students engaged with that content. Elizabeth's decisions about innovation are based on using instructional approaches that will be effective for her students:

> I feel like in terms of innovation there a million things I want to do every day but it doesn't fit for every kid, for every classroom. You have to know that right away. I could have the most amazing ideas but if I don't have the kind of kid who is going to buy into that, or the kind of group that's going to buy into that, it's going to flop no matter what. I feel like starting at the student and class level, and then building from there is maybe the best process that I use.

Later in the interview she explained that no two of her classes are the same:

> There's this idea in the public or in general that people are like, how can you teach that same book every year? Or that same thing over and over again? I never think of it like that. Ever. I've been teaching some of the same content over and over, but I never teach it in the same way. Sometimes that's great. That's what makes me excited about teaching. Sometimes it can be overwhelming. Not that you're necessarily reinventing the wheel each time but you're tweaking it and your changing it. You're fitting the kid with it. That's a lot of work. It's not like you go into your files and you pull out lesson plan three from week 12. It doesn't work. There's no way that works.

Similarly, Walt said that he starts over, to some degree, with every class he teaches:

> I know what I need to cover every semester. I'm going through like the calendar and I'm planning what's coming next. Very rarely do I necessarily remember exactly what I did last semester. It's almost like the way my mind works, in a way, even though I have a lot of the raw materials, like the handouts and stuff, in a way, I'm just starting a little bit from scratch. Even if I wanted to be the teacher who does everything exactly the same way, my mind doesn't work in the way to recall exactly how it was done. I think it's very easy for me to know the group of kids that I have and what's going to work and what's not going to work. Almost again, not completely start from scratch, but plan fresh, in a sense.

Eleanor expressed the need to find ways to teach each class differently:

> I'm still trying to figure out how to teach 32 tenth graders fourth period. It's not easy and I'm trying to figure it out. These are really bright, motivated kids, but they're really chatty. I don't know how to teach them yet and I've been teaching a long time.

Participants saw room to improve their instruction and recognized that each group of students has unique needs. As part of seeking effective instructional approaches for their classes, teachers in the study were willing to accept and put into place new ideas when they had them.

N**ew ideas.** Teachers in the study are open to new instructional ideas and are willing to act on them. New ideas emerge at unexpected times for teachers. Gloria described how she made an innovation to her instruction as a result of playing with her young children:

> My kids were playing with Play-Doh up on the kitchen island. They were like, "Mom make a dinosaur. Mom make this." I'm kind of like making little things. Then it got into a discussion of where did the dinosaurs go? What are theories about the dinosaurs? It just clicked with me for sec. I'm totally using this in my classroom. That night I went to bed and I started thinking about a really complex article about the Middle East that I had just read in Newsweek … I was like, I want to use this in class but I don't really want to make it a formal assessment. What can I do with it? What I came up with was that kids were going to create ... I was like I'm going to buy a ton of Play-Doh. I'm going to have the kids create a sculpture based on the contents of this article. Then they have to demonstrate why their sculpture looks the way it does on the article.

When the teachers thought they needed to make a change to what they were teaching or how they were teaching it, they often put the ideas into place quickly. Jane described how she comes up with innovative ideas:

> It's just this process I go through in my head where I kind of think of a way I've never thought of organizing before or explaining something or a new way of doing practice. It's usually the morning of or the day before when I just come up with something that I think will work better for kids and I kind of ditch what I was planning and try something new and it often works really organically, like I kind of go into the class with it planned and then feed off of what the kids give me and change it from there. I don't know if I can give a better answer than that, it's very spontaneous usually.

Similarly, Elon shared an example of having a new idea in the shower the morning of a lesson and then rushing to get to school and put it in place for that day. On the other hand, Julia said that ideas do not pop into her head the way that Jane described. During a focus group, she and Steve identified district in-service days as a place that they get new ideas.

Several teachers shared how developments in the world affect their approach to instruction. In order to increase the relevance of what they are teaching, English, science, and social studies teachers said they adapted lessons to incorporate recent development and trends happening in the world outside of school. They make room for current issues and events in their instruction. For example, Paul spoke about his astronomy class:

> I think I'm on my 100th time teaching that class and I don't think I've ever taught it the same way just because look what's happening to the governmental stuff going on now, not to get political but it affects us.

The community outside of school was not shared as a major consideration of teachers when they made decisions about their instruction. However, Walt feels the community is conservative and thinks that limits what happens in classrooms.

Participants in this study are open to new ideas that could engage their students and keep their classes relevant. The inspiration that teachers felt to make changes to their instruction was mixed with frustration and excitement.

Category 2: Personal Feelings

Teachers recognize that making innovations is a messy process that includes failure. Teachers identified a variety of causes that can lead to frustration during both the ideation and implementation phases of a lesson. They also shared the excitement that comes from developing activities and getting a positive response from students.

Frustration. Many teachers spoke about the feeling of frustration that comes with making innovations to their instruction. Teachers described a frustrating gap between what they imagine and what they are able to implement in their classroom. For Eleanor, the frustration was inherent in making innovations to her instruction because the reality of teaching will never live up to her ideal vision of what it could be:

> I would want to put frustration at the top of the list because if your vision is really big and beautiful, then you just have to know, you're never gonna ... It isn't given to us to accomplish a grand and glorious vision. That just doesn't happen. There's a lot of frustration. There's a feeling of wishing that I could succeed with every kid.

Other teachers believe they would be able to develop and implement their ideas but were frustrated during planning their instruction because there is a gap between the ideas they have and the time they have to develop those ideas. After teachers created a new lesson or activity they could still be frustrated by what happened in the classroom.

Several teachers recognized that they get frustrated when students do not respond the way they would like to the changes in instruction. The source of this frustration come from students being more comfortable with traditional approaches to instruction, the new

approach not garnering a positive response from students, and students not putting in enough effort from the onset to give the new approach a chance to succeed. The former was expressed by Jane:

> I just had a case in the fall where I was doing something that I knew was gonna be really good for them in the long run, but they had to get on board and invest in it and I had a couple kids really pushing back on it and after two weeks, a couple of those same kids came back and said, "You were right. We're glad we did this way. We understand it better, we're more confident." And I said, "Good. You trusted me and we got there." So you just got better drag them through sometimes.

The latter was expressed by Elizabeth when talking about a new activity she designed for her English class:

> Well, there's definitely a lot of frustrations. I feel like the time certainly. I run out of it. That's probably number one. Number two, you can get frustrated with a particular group of students. I'm always telling them meet me halfway. Meet me halfway. Sometimes it gets to the point where I go, all right folks I'm working 90% of this and you're giving me 10. That's really frustrating because I'm trying to really go the furthest extent that I can in mixing things up. Getting you engaged or getting you to revise something. Then you're not really doing much. It can be frustrating, maybe even more so frustrating, when you go out on a limb and try something and you take a risk.

Another source of frustration is if the instruction does not have the intended effect on student learning. Walt has come to accept this result with less disappointment than he did in the past:

> Frustration just comes when you try something that you think is going to be really cool and it fails. I guess part of me being older now also is accepting that more than I used to. Like I used to take it really to heart, and now, it's just like, "Oh, it didn't work." Try it again next semester differently, or just not try it again.

Tim also identified the need to accept frustration as part of the innovation process:

> Putting time in and not having things turn out the way you hoped. Frustrating, but that's part of the deal. I think you even see it with first, second year teachers, 21st, 22nd year. Everyone's trying new things. They're not all going to be home runs. You just go with that. You fix them and make them better.

When a lesson did not go as imagined the teachers described being willing to start over and make changes to try and fix their instruction. Many stated that it was important that their students learned after a lesson was unsuccessful so they had to do something else. Although teachers expressed trepidation about trying new instructional approaches, they do not let that stop them.

Some teachers' frustration was a result of feeling constrained by the requirements of district-wide curriculum and assessments. This was a topic of exchanges in both focus group interviews. In the first focus group, Angela expressed that the final exams she has to use with her students restrict what she is able to teach them because she needs to teach what is on the test. In the second focus group, Jane, Steve, and Julia had an exchange where they all said they felt limited in their ability to be innovative in courses where there are many topics to "cover" in the curriculum. They specifically identified math, Advanced Placement (AP) Physics, and chemistry as courses where this was a problem. Jane concluded the exchange by saying the following:

> And when you want to have the kids reflect and say, well, we're struggling with this and I want to be innovative and open to them maybe needing more time to learn something. Okay we need to do this again tomorrow, we need to do something different. I look at my calendar, I say, well we can't. We gotta just keep moving and that to me is the biggest barrier I can't figure out how to overcome despite working with colleagues and saying we need less curriculum, we just seem to get more every time we write a curriculum.

Participants accepted that frustration was part of making innovation but it was not prohibitive to them. They acknowledged the frustration and continued to change their instructional approaches. Although teachers find making innovations to be frustrating at times, they also find it to be enjoyable and exciting.

Excitement. Teachers who participated in this study described being excited by developing innovative instructional practices. Many of these teachers are invigorated by the planning process. When Elizabeth was asked what feelings occur to her when she makes innovations to her instruction, she said, “Mostly for me, excitement. Like I mentioned, that’s what I like to do. It’s what I thrive on.” Planning and instructing her class are her favorite parts of teaching. Josh expressed the positive feeling he gets from changing his instruction and his approach when he said, “It wasn't a conscious effort. It wasn't like, oh I'm going to be an innovative teacher. It was just like, that's kind of cool, and I just gave it a shot.”

In addition to the process of developing new lessons, the teachers in this study expressed being excited when they have success with innovative practices in their classrooms. Helen was hesitant to use an interactive notebook with her math students at first. She thought that approach was more appropriate for middle-school than high-school students. After Helen tried interactive notebooks and saw how her class responded to them, she wanted to use them more:

> I never saw myself as that kind of person, but I have found that I've completely jumped in and I did surprise myself that I'm really into it and when I started making those changes, now I'm excited. Now I know after that first experience, I know that the kids are okay with it so now, what was apprehension just with that activity, now I'm like, okay, I know this works so I am excited to try it.

Participants are invigorated by the process of developing new activities and approaches to instruction for their students. They are also bolstered by the response they get from students who have a positive reaction to the changes they make. In order to attempt an innovation, teachers needed to feel secure and have the freedom to make changes.

Category 3: Risk Taking

Teachers described how security and freedom are necessary for them to make innovations to their instruction. The willingness to take risks was not something that existed for all the teachers at the beginning of their careers. Most of the teachers in the study developed the sense of security and freedom as they gained teaching experience.

Security. Many of the teachers recognized that they feel more comfortable making innovations to their instruction now that they have teaching experience and are established in their schools. After several years teaching a course, they understand the content well enough to make informed changes to how they teach it. For example, Steve said, “I've been teaching AP Physics long enough that I can see the whole picture of the curriculum” and explained that he was now comfortable teaching topics in a different order than in years past. He feels that the instructional decisions he makes now are decisions he could not have made as a new teacher.

The confidence that comes with experience also allows teachers to feel effective. Walt said, “The last few years probably, has just been a lot at more at ease. I know what I'm doing and just more confident. I think I feel pride in my, I guess, ability to just try new things. I'm not afraid of it.” Similarly, Gloria, who is now in her eleventh year of teaching said, “I would say that last year was the first year that I pretty much thought I was being an effective teacher.” Furthermore, Jeff is new to teaching Advanced Placement Macroeconomics and he says it is hard to be innovative when he is still developing his content knowledge.

Teachers with experience also feel they have enough credibility among students and administrators that their reputation is insulated from the possible negative effects of a

new instructional approach that is unsuccessful. Eleanor said, “I feel like I have a protective covering that [principals] don’t mess with me.” For some teachers, it was not easy for them to tolerate a failed lesson earlier in their career. Gloria shared that having her own children, coupled with her experience, forced her to be more open and accept the possibility that a lesson may not go as planned:

> Literally it took me having twins to relax a little bit. Which is the most ridiculous thing ever. Before that I had to have every second planned. I had to have every single nook and cranny filled in. Now I'm like, you know what? This might totally flop. I'm okay with that. If [the principal] walks in to observe me or if someone I'll be like, you know what? This was a disaster. I have that flexibility to do that.

Participants in this study feel secure enough that they are confident making changes to their instruction. They can make informed decisions about the curriculum and withstand unsuccessful attempts at innovation. Coupled with security is the freedom to make choices about the instruction they will use with their students.

Freedom. The teachers in the study are the primary decision makers with regard to instructional approaches in their classrooms. They are responsible for developing, implementing, and assessing the effect of their lessons. The feeling of freedom developed over time for some of the participants. Walt shared that he would have liked to have taken more risks with his instruction earlier in his career but did not have the confidence to do so. Gloria shared the feeling of freedom that she acquired after having her own children:

> The game changed for me, like I said when I had my own kids. I think of now my classroom as what if these were my kids? What kind of classroom do I want my kids to be in? Is it a classroom where they're sitting constantly taking tests and spitting back facts? No, because that's not real life. I just totally changed.… For me it's like what do I have to lose? It's weird to say that but it's sort of like I'm more of a risk taker now in a much better way because I do what's best for kids. I do what I would want for my own kids. I'm like, you know what? If something

> was to happen that I was to get fired, oh well! I'll be fine! It sounds ridiculous but it's kind of true.

The lessons teachers develop can be constrained by the written curriculum. Jane said there is so much in the math curriculum that they cannot go deeply into topics. She feels, “we need to move away from teaching so many topics.” Teachers also feel responsible for preparing their students for district-wide final exams and Advanced Placement assessments. Eleanor also mentioned that her students are required to take a state exam as well but she did not express concern about the effect that exam has on her instruction, although she would prefer that it did not exist.

Teachers involved in the study felt the amount of curriculum they needed to teach restricted their freedom and was a major barrier to innovation. When that barrier was reduced because the course curriculum was more flexible, teachers had room to be creative. For example, Jeff expressed that he was able to be innovative when he taught a Social Studies elective without a final exam:

> In terms of the way I'm doing things in my classroom with the activities we're doing, that's where in terms of like where I'm focusing my innovation is Sociology. Because I can, you know there is really pretty much no, the curriculum guide's there but there's no final. There's no really requirements. So I can pretty much do what I want. And that freedom has, you know I was kind of not really looking forward to teaching [Sociology] again. But it's that freedom has allowed me to get creative and do things that, you know I'm excited to come into class and teach now.

As a follow-up to this statement during the focus group, Elon agreed that freedom provided room to be innovative and make the course relevant to students’ lives:

> I mean, I teach applied math and I can pretty much do whatever I want. So it's really fun in that course, cause it's really relevant stuff. And I'm teaching them all about checking accounts, savings accounts, credit cards. So they're getting, and it's cool to make up different activities that are very, very relevant. And I got a lot of time to do that. But then in my AP Stat, I have no time to really play with it as much as I'd like to. I mean I'm, ‘cause especially in the spring, I gotta get

> everything done before May. And try to get all of this content in and for the final and for the test. And then afterwards, then I can start playing and having fun. And doing some, going back to some cool stuff.

With experience, teachers feel that they can be more selective about new instructional approaches that they choose to try. Tim explained:

> I might have felt more pressure to do it because I was in my first few years, where now being more established, I don't feel like I have to try every new bell and whistle that's thrown our way. That falls more into technology. There's so much technology thrown our way. I don't have to try everything. If I see something that might work, great. If not, push it to the side. Go with what's been working and when something comes along, maybe I'll try it. I don't feel like I have to try as many new things now.

The idea of having the freedom to be selective was also expressed by Steve who said, “so I've made a real effort, any time I'm gonna tackle something new, to make sure that it fits in the most useful way instead of just being the most recent trend.” Steve said this was a result of feeling the pressure to use technology that was shown at a district in-service day and finding that students were saturated from many of their teachers using the same technology at the same time.

The security that came with experience and the freedom to use new approaches in the curriculum were major categories that came across in the interviews. These conditions allowed teachers to take risks and make innovations to their instructional practices. For teachers in this study, there were two main motivating factors for them to change their instruction.

Category 4: Teacher Motivation

Teachers were primarily motivated to make innovations to their instruction because of their students’ experiences. The teachers want their students to enjoy class and benefit from the instruction that they provide. Some teachers described reflecting upon

how students responded to their teaching practices and were motivation to implement a new and better approach as a result. Teachers also made innovations to their lessons for personal reasons. They want to be sure that they enjoyed their time teaching and can be proud of the education they provide to their students.

Responsibility to students. The teachers in the study stated the importance of students' responses to their lessons as the most important reason why they initiated changes to their instruction. Teachers in the study saw it as their professional responsibility to create lessons that work for their students. Teachers described a need to ensure students were engaged when they were in class. Larry said, "Realize yeah, you're getting them to learn, you're their teacher but you better be their entertainer too. And get them engaged and make them smile and make them be happy." Angela shared that lower-level classes in particular require her to reflect on her instruction and make changes:

> I like the challenging behavioral group. I don't know why. Yes, I'm crazy but I've always found that they force me to be innovative. They force me to always be on my toes. They force me to be real. And so they get me to think in ways that I wouldn't normally think about things. Cause I have to think about things from their perspective.

Steve and Larry also shared that they changed their approach to teaching after specifically being confronted with how students responded to their instruction. Steve said his principal told him there had been complaints about his teaching and he wanted Steve to conduct a survey of his class. As a result, he was forced to evaluate himself and made a conscious decision to change. Larry conducts surveys of his students each year to gather feedback about how to improve his instruction. In one of the surveys, early in Larry's career, a student told him he was "all style and no substance." Larry reflected on this, concluded that the student was right, and made changes to how he teaches and assesses

his classes. Angela agreed, “You have to be willing to accept that and figure out what do I do with that. Yeah. That's what forced innovation right there.” Separately, Gloria summed up her thoughts about innovation towards the end of the interview by saying, “Just constantly changing. Constantly reading. Constantly learning. Taking honest feedback from the kids.” Students’ responses affect the teachers’ actions.

In the first focus group, each participant expressed the importance of ensuring their instruction is relevant to their students. For example, Elon stated as a matter of fact, “Well, you have to evolve to keep it relevant.” Participants in individual interviews also expressed the importance of relevance as a reason to change their instruction. In Eleanor’s words:

> For me, it's about being really, really open and responsive to what arises amongst the kids, and it's about listening carefully to what they're saying and figuring out what group I've got so as to know what it is that they need. Innovation, for me, is about wide open listening and wondering, okay, what have I got that I can give to them that will be relevant to where they are right now and the ideas and concerns that they're voicing?

The teachers in this study know they have curricular objectives to help students meet and they feel it is their responsibility to find the best ways to help students meet them. Julia shared that formative assessments using technology helped her realize that she needed to make changes to her instruction:

> I look around and I'm like, yeah, they love this class, they love this topic, they know it, but then they really don't and so it was kind of eye-opening to say like, okay, I have to review that or have to maybe do a better job presenting it.

Jane agreed:

> Thinking that things were going well, thinking that kids were understanding what was going on, and then getting an assessment back or feedback where I realized this is not working, what I'm doing. So that's typically it. If it's not working, I need to fix it; I need to do something different.

Also, because the participants teach different students each year they reflect on their previous students' experiences and modify their approach for their new classes. Elon reflects on his instruction for the purpose of improving how he will help his students learn the next time:

> I always think about what was challenging for the students last time? And then how can I make that better? How can I get it to them in a different way, a better way that's going to make them understand it and figure, suddenly get the light bulb on.

Similarly, Helen is innovative for the purpose of improving those areas of her instruction that are not as effective as she would like:

> I was like, I know I have to change this, and I think that's where I try to focus is not necessarily making changes just to be innovative. It's, how can I make changes in areas that are not working? Because that's what I want to fix. I want to fix the things that are not working and try to make them into something that is working rather than just trying to throw in innovation for innovation's sake.

The teachers in this study feel an obligation to ensure their students enjoy their time in class and learn from the instruction being provided. These teachers are reflective and they see it as their responsibility to change if students are not having a positive experience. In addition to being attentive to the needs of students, the teachers in this study also had personal reasons for changing their instruction.

Personal fulfillment. For the teachers who participated in this study, teaching is part of their identity. Many of the participants in the study expressed that being a teacher is not just what they do; it is a large part of who they are. When asked what motivates him to make innovations to his instruction, Larry started his response with one word, "happiness." The other members of the focus group agreed that they want to be happy and have fun at work. Elon shared that he worked in a cubicle for two years and "hated it." He then said, "I love coming here and every day is a little different." Teachers stated

without hesitation that they approach teaching from the standpoint that they always want to change how they teach their courses.

Teachers were motivated to make innovations to their instruction because they wanted to avoid their personal boredom that comes from repeating the same lesson. Teachers said that they never teach a lesson the same way twice, they modify it to create a new lesson each year. Several teachers also stated that they did not want to be like teachers who do not seem to change how they teach. They gave negative examples of both teachers currently in their buildings and also teachers who they had when they were in school. Elon shared an example of what he does not want to be as a teacher:

> I remember I came in to like one of the first days of schools and there was a teacher, and he was making copies, just copies, copies, copies. He was doing his entire marking period in one day of copies. I can't fathom that. Like that's, where I'm trying, how could you lock yourself into that. Well it's the way I've done it every year. God, that's awful. And it's just terrible. So boring.

Teachers brought ideas of professional and personal motivation together in an early exchange during the first focus group. Larry began by saying:

> I'd like to think that if a student who I had 23 years ago, walked into my classroom today, they'd say, "This is not anything of what I experienced." Cause each year, you change, you evolve, you do something different, you play with something different. You don't be afraid. And hopefully administration supports you. And if it works, fine. If it fails, throw it out and try something else. But the willingness to adapt. It's exciting. I mean if I were doing the same thing today that I were doing 23 years ago, I'd bang my head against the wall.

Jeff followed up with the following:

> Well to mirror a lot of what you said [Larry], you know it's, the number one idea is the idea of I'm in my fourth year teaching and if like [Larry] said, if I'm doing the exact same things the next 45 years, that's not fun to me. That's not exciting to me. So part of it is, am I excited by what I am doing in the classroom.

And then Angela added:

> I think to just jump on something that you just said, I think if you know I'm in my 20th year teaching so I like [Larry] said, I would like my students 20 years ago to come back and be like, a whole new ball game. And I'm like that, I think, from semester to semester. I get bored very easily. And if I'm bored teaching something, then I can just imagine how the kids must feel. So that immediately is one of my triggers, if like, oh my God I've said this the third time today and I'm ready to like go crazy. Then I can only imagine how that must be sounding to the kids or what it must look like. So I sometimes use myself as a litmus test of how interesting it is and then sometimes that can prompt how innovative I try to get. But I have never taught the same thing the same way. Ever. You tweak, you have to adjust. For your own sake too.

The participants enjoy teaching and they make changes to their instruction, in part, to ensure they continue enjoying teaching. They want to be part of a vibrant classroom where students and teachers are both having a positive experience. The personal nature of the classroom also continues into teachers' planning. Teachers identified similar motivations for changing their instruction but they make most of the changes by themselves.

Category 5: Limited Collaboration

Most of the teachers in this study exchange ideas and resources with their colleagues but are limited in how much they are able to collaborate. Two of the participants stated that they work in isolation. All of the teachers cited lack of time as a primary barrier to making innovations to their instruction.

With colleagues. Most of the participants in this study gave examples of modest collaboration with colleagues when they make innovations to their instruction but they do most of the work on their own. Teachers described sharing ideas during quick in-person conversations that may take place between classes, during lunch, or when they are making copies. They used these opportunities to ask for ideas about how to teach a

specific topic or get feedback on an idea or activity. When teachers are given an activity or idea from a colleague they usually adapt it for their own use based on their personal preferences and the needs of their students.

Teacher collaboration tends to be with colleagues in their department who teach the same courses. Gloria shared the positive relationship she has with a colleague in the same department, "[Social studies teacher] is my next door neighbor. I feel very comfortable with him. We're always bouncing ideas off of each other. I'm like, 'Is this a bad idea?' He's like, 'Yes. It's a terrible idea.' We're very honest with each other." Tim explained that the sharing within departments is because those people are teaching the same curriculum and there is not interdisciplinary teaching in the high school. Helen said she feels comfortable going to a few teachers in her department to ask for help. She even observed another teacher teach a lesson that her students were having trouble with. Helen also talked about looking to Pinterest and Twitter for ideas about specific topics. Elizabeth, who teaches English, gave an example of visiting a science teacher to ask for help using technology and she has sat in on their class for ten to fifteen minutes to watch them explain to their students how to use it.

Sustained collaboration with colleagues takes place much less frequently. Participants gave examples of time during in-service days when they were able to work with colleagues but that was not always to develop new approaches to instruction. Teachers also said they use time during the summer to make more substantial revisions to curriculum and units. There is more structured support in the district for using technology because the district has technology facilitators who are able to support their colleagues. Angela said that she had to try using instructional technology on her own but once she

started she found people in her school who were there to support her. Although most of the participants engage in limited collaboration with colleagues, not all of them do.

Two English teachers shared that they make changes to their instruction entirely on their own. Eleanor believes she is only able to instruct the students in her course alone:

> I'm not really a team player. When people say that about people, what they tend to mean is that they're hostile and egotistical and it isn't that at all. It's just I'm not really a sport person, and it's hard to put into words. Teaching, for me, is like gathering kids up and heading off and flying. You just can't do it with somebody else.

Similarly, Walt said that he does not collaborate on instruction either. He will work with colleagues during in-service time on something like changing a final exam but did not consider this work to be innovative. He even noted that the other eleventh grade English teachers are friendly and they talk with each other frequently but those conversations are personal, not professional. He described the lack of collaboration as a "flaw in our little culture" because their classrooms are in close proximity to one another and they have a common area that teachers share. Across interviews, teachers gave examples of fitting collaboration into a day that is not structured to support it.

Barriers. Limited time was identified by teachers as the primary barrier to them making innovations to their instruction. Limited time constrained their ability to develop their ideas alone or in collaboration with a colleague. Gloria said, "I have so many ideas in my head that take so many hours to plan. It's really frustrating that I don't have more time during the school day." Helen said, "Sometimes there's not enough time in the day for me to plan for the next lesson, tomorrow's lesson, or get my grading done from the previous day, and also think about a few units ahead." Similarly, Jane said, "time for

preparation is huge. That's oftentimes when I find myself just falling back on something I've done in the past, it's just, there was no more prep time available." Teachers come up with ways to compensate for the lack of time in the school day and accept it as a limit on their ability to be innovative.

Some teachers use technology to overcome the barriers to collaboration of time and location. They use text messages and email to ask questions and exchange ideas with their colleagues. The largest example was the group text that Gloria described. It started with just members of the social studies department but has expanded from there:

> Now the group text is 27 people. It's insane. I probably get 500 to 600 text messages a day on this group text. It's good! It's sharing of articles. This is what we're talking about in English. You guys might want this for Modern World. It's amazing! But it's all consuming. I have to silent it at 10:30 PM at night. Then you'll get a text from [social studies teacher] at 2:00AM. It's about stuff that we're talking about in school.

Elon reacted to the statement he hears from many teachers that they do not have enough time by saying the following:

> I wasn't born with this knowledge. I just jumped into it and it's not like I have all the time to do it, I have a wife, and two kids involved in a ton of things like sports. I'm taking grad classes. I'm a busy, busy person too and I want a life and I want to go out with my friends and stuff. I just make a little time, a trial. And every year I build on it. And next thing you know you got all this stuff. But the negative idea that, "oh, I don't have time." They all think that you have to change everything about your classroom too, and you don't. Try this. Just this one little thing.

Teachers appreciate time when it is made available to them. Jeff, Larry, and Tim spoke positively about a recent in-service day when they had time in the afternoon to explore technology they were shown in the morning. During the regular school day it is difficult for teachers to work together because of their schedules and the demands on their time.

Teachers also spoke about how the physical layout of their school influences their interactions. Pleasant View High School 2 was designed so many teachers' classrooms near their grade-level colleagues and these teachers also share a planning area. Some of the teachers credited the close proximity for enabling the sharing of resources. When Tim spoke about collaboration he gestured to a room between classrooms. That is where he quickly checks in with colleagues about what they are teaching as they pass each other during the day. On the other hand, Larry, who teaches in Pleasant View High School 1, said that the other AP Macroeconomics teacher is across the building and he rarely sees him. Other teachers agreed that they may only see some colleagues at monthly department meetings.

Teachers expressed that most people are positive about the innovations they make, however, there are also negative reactions. Jeff said that some people regarded him as a "suck up" because he embraced using OneNote which was regarded as being put in place by administration. Angela described the feeling of being "judged" by colleagues for being enthusiastic and trying something different. She thought this judgment was often directed at younger teachers. Jane regarded negative reactions from colleagues who felt she was using too much of her personal time to make changes to her instruction as "a little disheartening."

Most of the teachers in this study collaborate with colleagues but feel constrained by the lack of available time. They develop informal ways to share ideas in a school structure that is not designed for teachers to regularly work together as part of their day. Some teachers also use technology to be more efficient in their classrooms and regain

some time. Administrators affect the innovations that teachers make to instruction through the conditions in the school and school district that they influence.

Category 6: Leadership

When asked about leadership, the teachers in the study spoke about school and district administrators. Teachers are most cognizant of how their school principal might regard their instruction if he or she were aware of what they were doing. At the district-level, administrators in the Technology department and subject-area Supervisors had the most influence on teachers' instructional practices. Participants only gave a few examples of teachers in the context of leadership. Specifically, they identified the technology facilitators and Paul, who provides professional development to teachers around the country about climate science. Administrators affected instructional practices by creating an encouraging environment where teachers feel supported.

Administrator Support. Teachers appreciate being supported by administrators in their building. They spoke about the trust their administrators show them that creates an environment where they can make innovations to their instruction. Sometime administrators specifically encourage them to "try new things" and "have fun." More generally, they "give the vibe" that teachers should try new instructional strategies with their classes. Julia stated that administrators have given her the confidence to try something new with students:

> They serve as like a motivator, a pep talk, someone to kind of say hey, you can do this, you got this, here's what available to you, now go and try it, like I feel like that helps to inspire me, that motivation piece, like they believe in me so I'm gonna believe in myself too and do that for the students.

Helen also had positive experiences with her building administration:

> Our principals are very knowledgeable of technology. Not just technology. They are very supportive of what teachers want to do to be engaging to kids and they are very encouraging of teachers too, and I feel like I don't hear this a lot from administrators but, have fun. Have fun doing what you're doing because that's what the kids will... They will see that you are having fun and they will just leave the room with a positive feeling. My principals will send weekly emails with an inspirational quote. I find them to be very supportive and they have good ideas that I know I can definitely go to them for help with student issues or help with presenting content. Even though none of them right now are or were math teachers, there are definitely ways that things can carry across.

Jane also expressed feeling trusted to be innovative and supported if she needed help, specifically with technology issues. Administrators supported innovation in tangible and intangible ways.

Some teachers provided examples of administrators who supported innovative practices by sharing ideas and resources. Jeff feels that the math curriculum supervisor shows interest in what is happening and he shares resources with the teachers in his department. He also spoke about a past assistant principal who frequently shared resources for him to try with his students. This principal would say, “Try it and let me come see it.” Teachers gave examples of benefitting when administrators facilitated the sharing of resources among teachers. One teacher shared that her principal identified other teachers she could visit to see what they were doing with their students. Teachers also used new instructional ideas in their classrooms that they first learned about at building and district-level meetings. Steve remembers a former science curriculum supervisor who was inspirational and helped teachers understand best practices for developing students’ conceptual understanding.

Administrators also lead changes to curriculum that requires teachers to change their instructional practices. For example, Helen recalled the need to make innovation to

how she taught Geometry because the math sequence changed. Since students did not have the same prior knowledge her lessons we not as effective as they had been. She put it this way:

> I taught it just like I normally would and it didn't work. It just didn't work. I could tell that it wasn't a good overall presentation, so I spent a summer just completely changing my mindset. What worked before doesn't mean it's going to work anymore, so I have to change my way of thinking.

In this case, a district-level decision about the sequence of the math curriculum contributed to changes in instructional practices.

Angela and Jeff expressed that innovation has been recently aided at the district level by clarity around the goals for technology use and how the district will move towards that goal. A part of the success is the technology committee where teacher technology facilitators from each school meet a few times a year to learn about developments in technology and then share those with teachers in their buildings. Teachers shared that clear goals and resources are helpful to them but they do not get what they need from all administrators.

Ineffective Practices. Although administrators can support innovative practice they are not always effective at doing so. In one of the focus groups, Angela spoke about the negative effect that a lack of trust shown from past district-level administrators has had. She labeled it a “controlling mindset” that she feels created “animosity” and “resentment.” Jeff and Larry agreed with her. She said it continues to have a negative impact on innovation but she sees changes in the district with new people in administrative roles. Later in the focus group interview she spoke of the important role that administrators play in her school. She said, “We're fortunate to be in a building where our administrators do welcome us to think outside the box. Do encourage us to

take calculated risks but understanding what those are and what the consequences can be.” She went on to say that principals in her school want teachers to use technology in innovative ways but the history of mistrust has made the progress slow.

Some teachers felt that a lack of direction was a barrier to innovation. When there are too many initiatives happening at once it made it difficult to focus on any of them. Jeff spoke specifically about technology:

> It was every other year there was some new flavor of the month that they'd pick up and then they'd throw it away for something else. So from the tech perspective again, I think a lot of the hesitancy we've felt in our buildings had come from the idea of, “Oh this is just going to be a flash in the pan and then we're going to go to something new when someone else has a new pet project." But from you know some of the infrastructure that's been put in place like the tech committee and some of the other things that are going on in the upper admin levels too, there's definitely a goal that is formulated and a path that we're going down that I think once teachers can see that okay this is the way we're going for a while, it's going to take away some of that hesitancy and some of that resentment.

Sometimes school district administrators feel bureaucratic and unhelpful to teachers in this study. Gloria expressed the feeling that district-level administrators move too slow. She said, “It's frustrating that up here is a turtle and we're like totally fast right down here. We have no choice because the kids are constantly changing and moving.” She feels district-level administrators are behind where students and teachers already are with technology. Specifically, she gave the example that administrators were hesitant to allow access to YouTube but when they recently made the decision to do so students did not seem to care. Eleanor described the school district as an unresponsive bureaucracy:

> [Pleasant View] is such a top down district. Information flows only in one direction. There's no way for teachers to communicate. We don't have the view from the mountaintop, but we've got the view from the trenches and we're the ones who deal with kids. It's all very well to say, "Oh, here's a brand new thing and this is what they say is the best new thing." The teachers, when they say, "It's not gonna work with my kids," that can really be true. It isn't just nay saying.

> "This did work with my kids" is really important information also. The idea that there isn't a single way.

Larry went further and said, “I can't site one instance where a building leader or a district leader has aided and abetted me in being innovative.” He recalled an experience where he was told to stop doing something because the Assistant Superintendent’s child was in his class. As a result of the message he receives from administrators, he keeps his teaching to himself. He sometimes tells students, “this is just between us.” Some teachers feel that practices are tolerated by administrators but these administrators do not contribute to innovation.

Formal observations were not a major consideration for the teachers in this study. Some teachers mentioned that positive feedback as a result of formal observations is encouraging but they feel that the Danielson rubric used for observations does not encourage innovation. Paul, who has 16-20 years of experience, expressed that “when we talk about your observations and distinguished or whatever, I don't really pay attention to them anymore.”

Most of the teachers in this study feel supported by administrators but collectively they have had mixed experiences. They appreciate those administrators who help them make innovations to their instruction and have a negative reaction to those who do not. The findings that emerged from the focus group and individual interviews provide insight into the lived experiences of the study participants. Their experiences are consistent with much of the existing research into creativity and innovation.

Results and Interpretations

From the findings identified above, the section below presents themes in the form of results and interpretations regarding teacher creativity and mindset; teacher

experiences making innovations to instruction; environmental factors that influence the innovations they make to instruction; and leadership that influences the innovations they make to instruction. The major categories from the findings section are synthesized into the most significant themes that emerged from the research. These results offer interpretation with consideration of existing research. Overall, the findings support existing research into creativity and innovation. The experiences of the teachers who participated in this study indicate that the innovations they make to their instruction are affected by both personal and environmental factors, including leadership.

Result 1: Teachers Make Innovations to their Instruction for Professional and Personal Reasons

The teachers in this study make incremental improvements to their lessons for the purpose of achieving curricular goals and engaging their students. They primarily identified changes to instructional activities at the lesson and unit levels. Some teachers make use of new technologies in their instruction to improve efficiency. During the interviews, teachers described approaches to instruction that broadly follow a design thinking model (IDEO, 2012). They seek to understand challenges to student learning and engagement, develop ideas in the form of instructional approaches to address those challenges, implement the new approaches to instruction, monitor the effects, and refine the ideas based on how well they worked with students. It is important to the teachers in this study that their students both are engaged in the class and learn from their instruction.

Consistent with other research, these innovative teachers are aware of their students' experiences in class and they want that experience to be positive (Emo, 2015). They took a human centered approach to planning for instruction. Eleanor expressed this

when she said, “Innovation, for me, is about wide open listening and wondering, okay, what have I got that I can give to them that will be relevant to where they are right now?” They are willing to start new with each group of students and experiment with approaches to instruction in order to address challenges they had teaching their current class or previous classes. They monitor their students during lessons and gather information from them about their experiences in class with the goal of improving their instruction. The teachers are aware of the written and assessed curriculums and they consider the innovations they make to their instruction within those bounds. Although they believe that implementing new approaches to improve instruction is their professional responsibility, it is also a personal one.

For the teachers in this study, their approach to instruction goes beyond what they do; it is who they are as people. The teachers in this study make changes to their instructional strategies for their own satisfaction and enjoyment. In Larry’s word, they are motivated to make innovations because of “happiness.” The teachers are intrinsically motivated by the pleasure of improving their lessons. The novelty of new approaches to instruction helps them stay engaged with their teaching. Not only do they use personal time to develop their instructional approaches but also they draw upon their experiences outside of school to enhance their lessons. They are invested in their instruction and it is important to them that they do it well. This contributes to their feelings of frustration when they cannot realize their ideal lesson. Although teachers in this study have a strong internal motivation for innovation, the school and school district also affect their behavior.

Result 2: Teachers Need to Feel Secure Before Taking Risks

The environment where teachers' work affects their teaching practices. Teachers were able to be innovative when they felt secure in their positions. That ability was enhanced when they felt supported by school and school district administrators. This is consistent with the social environment component of the componential theory of creativity (Amabile, 1983; Amabile, 1988; Amabile, 2013). Since teachers primarily displayed their innovative instruction in the confines of their classroom, their students were the ones who would accept or reject the changes to their lessons. Teachers were also conscious of how their principals may perceive their lessons. Making innovations can be frustrating for teachers when their lesson does not have the desired effects for students but they persevered.

Teachers' level of experience has important effects on their decisions about instruction. Their experience allows them to understand the content they are teaching and the curriculum well enough to make informed and purposeful changes. In Steve's words, experience with the curriculum allows him to "see the whole picture." Teachers' willingness to make innovations to their instruction is enhanced by the security that comes from being established in their position. They believe their reputations could survive a failed lesson and they have the confidence to try something new. This is consistent with the recommendations that people have the necessary freedom, resources, atmosphere, and challenge to encourage creativity (Puccio, Murdock, & Mance, 2007). For most of the participants, the feeling of security developed over several years and was not something they felt at the beginning of their careers.

Result 3: Teachers Make Innovations to their Instruction with Limited Collaboration

Teachers have primary responsibility for their classrooms and control over the instructional strategies they use. They decide how instruction needs to change for students in their classes and they put any changes they make into place for themselves, sometimes quickly and often without the specific knowledge of administrators or other teachers. Even when innovations to instruction are made well in advance of the lesson, they are usually developed individually by teachers.

Consistent with criticisms of the industrial age model of education, teachers in this study are isolated from one another most of the time (Christensen, Clayton, Johnson, & Horn, 2008; Senge et. al., 2012). During the school day, if teachers have conversations about instruction it is usually with teachers of the same course that are in close physical proximity. Limited collaboration occurs in informal locations such as hallways, copy rooms, and storage areas between classrooms. Teachers who do not share the same curricular goals do not often work collaboratively to develop innovative approaches to instruction. The use of technology that transfers across disciplines and coaching from technology facilitators was an exception to this general trend. In-service days are a time where more formal collaboration among teachers may take place. Overall, there is not a structure in the high schools that systematically allows for the regular development and spread of innovative ideas as is recommended (Kelley & Littman, 2005). Teachers have come up with informal methods for working with one another.

Teachers have developed ways of sharing ideas with one another outside of the formal structure of the school schedule. Teachers are motivated to overcome the limited

time during the school day to collaborate during lunch, outside school hours, and in the summer. They described using informal networks that are facilitated by text messaging, email, and occasional visits as common methods for sharing ideas. These times and places for collaboration restrict who is available to collaborate and for how long. They also demonstrate that schools are not structured to facilitate the widespread development and adoption of innovative instructional strategies. Gloria described the feeling of all participants when she said, “It’s really frustrating that I don’t have more time during the school day.” Because of this, people throughout the school do not have much opportunity to encounter new ideas from their colleagues, form a positive view of them, and put them into place (Rogers, 2003). The structure of the school day has not prevented teachers from being innovative but it limits collaborative ideation, the sharing of innovative practices, and the refining of innovative ideas.

Result 4: Leaders Can Increase the Likelihood that Teachers Make Innovations to their Instruction

Participants identified administrators as leaders who affect innovations they make to their instruction. Specifically, they spoke about their principals, subject-area supervisors, and the administrators responsible for instructional technology. Administrators mostly have an indirect influence on the innovations teachers make to their instruction.

The teachers in this study recognize administrators for creating an environment in their schools where they felt they can try new instructional strategies with their students. For example, Helen called her administrators “very supportive,” “very encouraging,” and they want teachers to “have fun.” And Julia said, “they believe in me so I'm gonna

believe in myself too." The teachers described effective leaders who create conditions where innovation is likely to happen and be sustained. This is consistent with recommended leadership practices (Senge et. al., 2012). Some administrators actively encouraged teachers to try new strategies or provided examples of specific practices to improve instruction (Friedrick, Stenmark, & Mumford, 2011). New approaches to instruction were publically valued by being shared with teachers during faculty meetings (McCharen, Song, & Martens, 2011). In some cases, teachers saw examples from other teachers of tools or approaches that they wanted to try with students. Teachers appreciated those examples. However, in other cases, teachers were given examples they thought were irrelevant and they came to view the administrators as out of touch with the realities of the classroom.

The teachers did not describe administrators who actively facilitate the innovation process as the literature suggests (Kelley & Littman, 2005; Mumford, Scott, Gaddis, & Strange, 2002; Puccio, Mance, & Murdock, 2011; Reiter-Palmon & Illies, 2004). Teachers did not describe being placed on teams to develop new solutions or having leaders prioritize problems that needed to be solved. Administrators were not directly involved in helping teachers through different phases of lesson development and implementation. Although, technology facilitators do help other teachers plan and implement lessons using technology. Furthermore, teachers did not feel that they had adequate support to share innovative ideas or collaborate with other teachers to develop those ideas on a regular basis. Administrators encouraged innovations to instruction by affecting conditions where innovations may take place.

District-level administrators shape the context for instruction through the curriculum and core assessments in each course. They work with teachers to develop the curriculum and identify learning goals for students. Curriculum constrained innovation when teachers felt there was not time to change their approach to teaching and include all the required material. It also encouraged innovation in the example that Helen provided about the district-level decisions to revise the scope and sequence of math classes. Teachers did not feel that the instruction they provided was part of a school-wide or district-wide vision but some of them believe this may be changing. Overall, the teachers in this study experience leaders who are supportive of innovative practices in the classroom but are not directly engaged in their development and implementation.

Result 5: Creativity and a Growth Mindset are Associated with Innovative Teaching

Teaching is a creative field. The results of this study are consistent with the research that has shown a strong link between creativity and innovation (Mayfield, 2011; Reisman, 2016). The teachers who participated in this study self-assessed themselves as having a Moderately High or Very High level of creativity on the RDCA creativity self-assessment. Furthermore, in the interviews, teachers gave examples of generating creative ideas that they developed and implemented in their classrooms. Jane described her process as, “I kind of think of a way I've never thought of organizing before or explaining something or a new way.” The findings of this study align with the componential theory of creativity because the teachers identified as innovative possessed the individual components of domain relevant skills, creativity-relevant processes, and task motivation (Amabile, 1983; Amabile, 1988; Amabile, 2013). They connect seemingly incongruent ideas in sometimes playful ways. These ideas fall into the

category of Pro-c creativity (Kaufman & Beghetto, 2009). The teachers in this study also showed behaviors consistent with a growth mindset.

The results of this study provide support for the idea that a growth mindset is associated with teachers who make innovations to their instruction (Dweck 1986; Dweck 2006). 18 of the 21 teachers who responded to the self-assessment questionnaire were found to have a growth mindset. In the interviews, teachers expressed their belief that they could improve their instruction and their students' learning by putting in effort. Teachers identified feeling frustrated when they make innovations to their instruction but this did not stop them from taking risks and trying new instructional approaches. As Tim said, lessons do not work "you fix them and make them better." Teachers persevered through the frustration and setbacks that came with trying to make innovations to their instruction.

Summary

The results of this mixed methods study show that almost all teachers in the study self-assess themselves as possessing moderately to very high creativity on the RDCA, and a mixed or growth mindset. The individual and focus group interviews revealed six major categories: (1) Innovative Processes; (2) Personal Feelings; (3) Risk Taking; (4) Teacher Motivation; (5) Limited Collaboration; and (6) Leadership. These categories were developed into themes that are presented as five results of this research study: (1) Teachers Make Innovations to their Instruction for Professional and Personal Reasons; (2) Teachers Need to Feel Secure Before Taking Risks; (3) Teachers Make Innovations to their Instruction with Limited Collaboration; (4) Leaders Can Increase the Likelihood that Teachers Make Innovations to their Instruction; and (5) Creativity and a Growth

Mindset are Associated with Innovative Teaching. These results are consistent with other research into innovative practices and show areas that can be developed to encourage more innovation in schools. The experiences of teachers who participated in this study provide insight into teacher and administrative practices that can support innovative instruction. The conclusions and recommendations that come from this research are presented in the next chapter.

Chapter 5: Conclusions and Recommendations

Introduction

The purpose of this mixed-methods study is to reveal how teachers experience making innovations to their instruction. The quantitative data for this study provided information about teachers' background, creativity, and mindset through a self-assessment questionnaire. The qualitative data were dominant in the study. This data provides insight into the lived experiences of teachers and were collected from focus groups and individual interviews with teachers. This chapter offers conclusions of the study and recommendations for practices in schools that may be applicable across K-12 settings. This chapter also provides some suggestions to further the research into teachers' experiences with innovative instruction. Both the conclusions and recommendations draw from the findings, results and interpretations presented in Chapter 4. The conclusions are presented as answers to the following three research questions for this study:

1. What key themes emerge as teachers describe their experiences making innovations to instruction?
2. What key themes emerge as teachers describe the environmental factors that influence the innovations they make to instruction?
3. What key themes emerge as teachers describe the leadership that influences the innovations they make to instruction?

Conclusions

Research Question 1: What key themes emerge as teachers describe their experiences making innovations to instruction?

The first and fifth results emerged as teachers described their experiences making innovations to their instruction: Teachers Make Innovations to their Instruction for Professional and Personal Reasons and Creativity and a Growth Mindset are Associated with Innovative Teaching. Teachers in this study are purposeful about their instruction and want to improve how they teach their students. They are open to creative ideas that will engage their students and help them learn. The teachers in this study feel both frustration and excitement when they make innovations to their instruction. They are motivated to make innovations to their instruction because of professional responsibility and personal fulfillment.

The teachers in this study do not want to be boring or to be bored. They approach each class as a new opportunity to provide effective instruction to their students. They reflect upon their practices and make changes to increase the likelihood that their students are engaged and learn. It is important to them that they avoid complacency as teachers. These teachers enjoy the process of creating and improving their lessons and they want to enjoy their time teaching in the classroom. By being innovative, they keep class interesting for their students and for themselves.

The innovative teachers in this study did not describe radical changes to their instructional practices. They make incremental changes to achieve established curricular goals. Teachers were frustrated by not being able to put their ideas into practice as imagined or when their practices did not have the desired results. Simultaneously, they

were excited by the innovative process and when the changes they made had a positive effect. They acknowledged failure as part of the innovation process and they demonstrated perseverance when they developed and revised instructional practices to meet their students' needs. Teachers demonstrated a growth mindset in their belief that they can improve how they teach and their persistence in overcoming setbacks. Their experiences are not only influenced by their own ideas and intrinsic motivation, but also their experiences within the environments of the school and school district.

Research Question 2: What key themes emerge as teachers describe the environmental factors that influence the innovations they make to instruction?

The second and third results emerged as teachers described their experiences making innovations to their instruction: Teachers Need to Feel Secure Before Taking Risks and Teachers Make Innovations to their Instruction with Limited Collaboration. Teachers' experiences making innovations to their instruction are affected by the school and school district environment where they teach. The environment can affect whether innovative instructional practices take place and the form these innovations take. The participants in this study need security and freedom before taking risks. These feelings take time to develop and can be weakened or strengthened by the actions of their colleagues, especially administrators. They engage in limited collaboration with other teachers but the most often make innovations to their instruction on their own. The school and school district environments affect the innovations that teachers make to instruction.

The teachers in this study needed experience before they felt confident making innovations to their instruction. Their successful teaching experiences over time provided them with security to try new instructional approaches. One of the reasons is that they

feel their reputation with administrators and students could survive a failed lesson. Experience also allowed them to develop their understanding of the content and district curriculum to the point where they felt comfortable changing how they taught it. In addition to feeling secure, these teachers had the freedom to adapt how they taught their courses within the constraints of the curriculum and required assessments.

The curriculum serves as a guide and goal for the innovations they make to their instruction. When the curriculum and/or assessments in a course are too prescribed teachers feel that they cannot make innovations to their instruction. When the curriculum and assessments are not encumbered by too much content, teachers had more room to try new approaches to instruction. Additionally, these teachers had the autonomy to decide how to teach their classes and to change their instruction if they saw the need. Teachers who were identified as innovative experienced an environment that provided them with a beneficial combination of security and freedom. The teachers did not describe an environment that promoted regular collaboration with colleagues.

The teachers in this study may consult with colleagues but they primarily made changes to their instruction and implemented those changes by themselves. Much of the teachers shared ideas with colleagues, during informal times such as lunch and outside the school day. They interact through the use of technology such as email and text messages. Teachers also gave examples of learning of new instructional approaches and working with colleagues during faculty and in-service meetings but these happen infrequently. Two teachers who participated in the study specifically said they do not collaborate although they have positive personal relationships with their colleagues. The primary barrier to innovation that teachers experience is lack of time. Lack of time

restricts teachers' ability to develop innovative ideas, share ideas they have developed, or work together with colleagues to create new instructional approaches. Teachers described environmental factors that directly affect the innovations they make to their instruction. Many of these factors are affected by leadership at the school and school-district levels.

Research Question 3: What key themes emerge as teachers describe the leadership that influences the innovations they make to instruction?

The fourth result emerged as teachers described the leadership that influences the innovations they make to instruction: Leaders Can Increase the Likelihood that Teachers Make Innovations to their Instruction. The teachers in this study look to administrators as the leaders who can support conditions that encourage innovative practices. Teachers appreciate a supportive school environment where innovative instructional practices are encouraged and administrators accept that new practices may be unsuccessful at first. The teachers in this study described building level administrators who demonstrated trust and provided encouragement. District level administrators affected the degree of innovation possible by influencing the required curriculum and assessments. The teachers in this study did not feel there is a clear vision for innovative instruction but see signs that one may be emerging.

Administrators can also facilitate the spread of innovative ideas. Teachers learned about new approaches to instruction from other teachers who were encouraged by administrators to share their practices during faculty meetings. Teachers also identified building and district level administrators who shared useful instructional practices and resources they could use with students in their classrooms. However, it is important that administrators are credible and teachers find the examples helpful. If teachers perceive

that what they are being told is not relevant to their teaching, they are likely to disregard it and they may develop negative views of leaders and initiatives. The experiences of teachers in this study provide insight into practices that can increase the likelihood that teachers make innovations to their instruction.

Recommendations

This study was undertaken with the expectation that it would reveal experiences of teachers who are recognized as innovative and provide insight into why and how these teachers make changes to their instructional practices. The results of this study provide insight into actions that can be taken in schools and school districts to support innovative instructional practice. Since innovations to instruction occur at the intersection of individual teachers and the environment where they teach, both affect the creation and implementation of innovative instructional practices. The following section includes recommendation for both professional practices and further research.

Professional practice. Teachers should understand their students' experiences and conscientiously avoid complacency in their teaching. The design thinking process is a model teachers can use to make innovations to their instruction. To begin, teachers need to have empathy for their students' experiences in their classes. Teachers also need a strong desire to ensure their students are having meaningful experiences as a result of their instruction. To do this, teachers should monitor the effects of their instruction. They can use formative assessments as they teach and solicit direct feedback from students about their experiences. School leaders can encourage empathy for students' experience across classes and throughout the school day by making it possible for educators to shadow a student (Wiggins, 2014).

It is also important for teachers to find personal fulfillment in their professional practices. School and school districts should cultivate cultures that protect and promote the enjoyment that teachers find in planning and improving their lessons. School leaders can support a playful culture where innovative teaching is celebrated. New teachers should be paired with mentors who both demonstrate creativity and joy through their teaching. The school culture should also embrace a growth mindset that recognizes all teachers are capable of making innovations to their instruction. This culture should clearly value perseverance and processes that lead to improvement. School leaders should recognize innovative practices, whether they are successful or not. They should also model innovative professional practices themselves and be open about the areas where those practices were successful and how they responded when those practices were unsuccessful. This will demonstrate that risk-taking is welcome and teachers can be secure taking well-designed risks with their instructional practices.

School and district leaders can support innovative instructional practices by establishing, communicating, and supporting a vision that specifically encourages teachers to make innovations to their instruction. Administrators should work with various stakeholders, including teachers, to develop that vision (Fullan, 2011; Senge et. al., 2012). The vision should allow people who do not have positional authority to be significant leaders in their school and school district. This will help build the capacity of leaders throughout the organization to facilitate the necessary changes (Heifetz, Grashow, & Linsky, 2009). The vision needs to guide the development of a school environment that allows for innovative practices to be created, implemented, and shared.

School and district leaders should align their environments with their vision by and creating conditions where innovation can take place. Leaders in the school and the school district should support teachers by directly encouraging innovation. Where the leader has expertise, they can share innovative practices, facilitate creative decision making, and work with teachers to develop new instructional practices. Leaders should also preserve time for collaboration and sharing among teachers. Even without major revisions to the school schedule or the school calendar, time can be provided during faculty meetings, department meetings, and in-service days for teachers to ideate, prototype, and refine instructional practices. This time can be flexible so teachers are able to work within departments, across departments, across schools, or even alone.

There also must be room within the curriculum and assessment framework for innovation to take place. Administrators need to collaborate with teachers to ensure that curriculum and assessments focus on the most important learning outcomes. Less important content should be removed from curriculum documents and should not be assessed on core assessments. Even when the curriculum is teachable, teachers may need help letting go of topics that they prefer to teach. Administrators and teachers need to reflect upon the needs of students and teachers, what is being taught, and how students are responding. This will reveal areas where adjustments to curriculum, assessment, and instruction are needed.

Future research. Future areas of research could expand the range of teachers involved in the study. It would be helpful to gather data about creativity, mindset, and the lived experiences of teachers who are not identified as those who make innovations to their instruction. It would also be helpful to research the experiences of middle-school

and elementary school teachers to see if there are significant differences from the experience of high school teachers. By comparing and contrasting the responses of different groups of teachers a researcher could help identify factors that are unique to innovative teachers and those that are common to all teachers. The larger the sample size of teachers, the more reliable the data will be. Specifically, a larger sample size would improve our understanding of the relationship between mindset and innovation and the correlation between mindset and creativity.

The feeling of security and freedom that came with experience and deeper understanding of the curriculum was a strong theme that came from this research. It would be helpful to learn more about how teachers develop this foundation for risk-taking over time and the role that environmental factors play in mitigating the fears associated with making innovations to instruction.

Ultimately, the effect that innovative teaching has on students is what is most important. Future research could investigate how students experience learning from teachers who make innovations to their instruction.

Summary

Creativity and innovation in teaching are important for schools to meet the changing needs of students in schools. By listening to the voices of teachers who are recognized as making innovations to their instruction, educators can make more informed decisions about practices that support innovative instruction. Both individual characteristics of teachers and the environment where they teach affect the instruction that they provide to students. The findings of this study suggest that creativity, a growth mindset, empathy for students, and personal fulfillment from teaching all play a role in

teachers' willingness and ability to make innovations to their instruction. Teachers also need to feel secure in taking risks and knowledgeable about their content before they make changes to their instruction. Innovation is encouraged by supportive school and district leaders and curriculum that allows room for teachers to develop new and useful instructional practices.

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Appendix A: Self-Assessment Questionnaire

Thank you for participating in this self-assessment questionnaire as part of the study titled, *A Study of High School Teachers' Experiences Making Innovations to Instruction.* The purpose of this study is to reveal how teachers experience making innovations to their instruction. This self-assessment questionnaire will ask questions about your teaching background, demographics, creativity, and mindset.

Demographics and Background

1. What pseudonym were you given for this study? _____

2. How many years of teaching experience do you have?
    a. Less than 5
    b. 5-10
    c. 11-15
    d. 16-20
    e. 21-25
    f. More than 25

3. What subject area(s) do you currently teach?
    a. English
    b. Mathematics
    c. Science
    d. Social Studies

4. Where do you teach?
    a. <*High School Name*>
    b. <*High School Name*>
    c. <*High School Name*>

5. What grade-level(s) do you teach?
    a. 10
    b. 11
    c. 12

6. What is your gender?
    a. Female
    b. Male

7. What is your race or cultural identity?
    a. American Indian/Alaskan Native
    b. Asian
    c. Black/African American
    d. Caucasian/White
    e. Hispanic
    f. Native Hawaiian/Other Pacific Islander
    g. Other
    h. Prefer not to answer

Reisman Diagnostic Creativity Assessment

The purpose of the Reisman Diagnostic Creativity Assessment (RDCA) is to identify your areas of creative strength and those that you might wish to enhance.

You will provide a response to 40 statements. Please judge how each statement describes you by using the provided rating scale: Strongly Agree, Moderately Agree, Mildly Agree, Mildly Disagree, Moderately Disagree, or Strongly Disagree.

1. I keep an open mind.
2. I am willing to tackle challenging tasks even when success is uncertain.
3. I regularly come up with novel uses for things.
4. I come up with new and unusual ideas.
5. I can make a decision when there are multiple possibilities or choices.
6. I follow many paths to come up with possible solutions.
7. I can generate many relevant solutions.
8. I come up with unique suggestions, thought up wholly or partly independently of other people.
9. I fill in details when drawing.
10. I am afraid of the unknown.
11. When faced with a problem, I evaluate possible solutions and select the best one.
12. I do well on activities or tasks that I find personally challenging.
13. I think in unconventional ways.
14. I come up with different categories of approaches to solving problems.
15. I will use more effort on an activity or task if there is some kind of incentive.
16. I share and advocate ideas I believe in, even when those ideas are unconventional.
17. I engage in activities that are personally satisfying.
18. I come up with multiple possibilities when analyzing a problem by looking at every angle of the situation.
19. I tend to elaborate on my ideas when speaking.
20. I usually think out of the box.
21. I come up with different types of responses to a situation.
22. I perform tasks better knowing there will be a reward or recognition.
23. I gather as much information as possible before making a decision.
24. I can tolerate the unknown.
25. Curiosity, enjoyment and interest energize me to complete a task.
26. I can select one solution from many possibilities.

27. I tend to keep adding to my drawings.
28. I can rapidly produce a lot of ideas relevant to a task.
29. I am very innovative.
30. I do well on standardized tests that require a single correct response.
31. I can generate different categories of uses for a specific item.
32. I keep listening even when I think I know what someone is saying.
33. Knowing that I am going to be rewarded enhances my creativity.
34. I am willing to take calculated risks.
35. I can cope with uncertainty.
36. I generate many ideas when I draw.
37. I prefer problems where there are many or several possible right answers.
38. My motivation to perform well does not depend on external recognition.
39. I tend to elaborate on my ideas when writing.
40. I generate many ideas.

Mindset Questionnaire

You will provide a response to 16 statements. Please show how much you agree or disagree with each statement by choosing the statement that corresponds to your opinion: Strongly Agree, Agree, Mostly Agree, Mostly Disagree, Disagree, or Strongly Disagree.

1. You have a certain amount of intelligence, and you can't really do much to change it.
2. Your intelligence is something about you that you can't change very much.
3. No matter who you are, you can significantly change your intelligence level.
4. To be honest, you can't really change how intelligent you are.
5. You can always substantially change how intelligent you are.
6. You can learn new things, but you can't really change your basic intelligence.
7. No matter how much intelligence you have, you can always change it quite a bit.
8. You can change even your basic intelligence level considerably.
9. You have a certain amount of talent, and you can't really do much to change it.
10. Your talent in an area is something about you that you can't change very much.
11. No matter who you are, you can significantly change your level of talent.
12. To be honest, you can't really change how much talent you have.
13. You can always substantially change how much talent you have.
14. You can learn new things, but you can't really change your basic level of talent.
15. No matter how much talent you have, you can always change it quite a bit.
16. You can change even your basic level of talent considerably.

Innovative Instruction Example

Innovative instruction can be defined as the use of new ideas, methods or strategies and activities by a teacher to improve the teaching and learning processes. A teacher can make an innovation to their instruction if the practice is new to the teacher who uses it even if they are not the original creator.

In the space below, please describe a recent example of an innovation you made to your instruction.

Appendix B: Semi-structured Interview Questions

1. Tell me about the process you use to develop new instructional approaches to use with students.
2. What is innovative instruction from your point of view?
3. Please recall an experience you had making innovations to your instructions. What happened in this experience? What did this experience mean to you?
4. What feelings occurred to you as you made innovations to your instruction?
    a. What, if any, aspects of making innovations to your instruction were frustrating?
    b. What, if any, aspects of making innovations to your instruction were exciting?
5. What motivated you to make innovations to your instruction?
6. What conditions in the school or school district affected you when you made innovations to your instruction?
7. What barriers to making innovations to your instruction have you experienced?
8. To what extent do you work with other people when you make innovations to your instruction? Describe that experience.
9. Has leadership in the school or school district affected how you make innovations to your instruction? If so, how?
10. How have other people responded to the innovations you made to your instruction?
11. Is there anything else about your experience making innovations to your instruction that you would like to share?

Appendix C: Permission to Conduct Research

Dear Institutional Review Board:

The purpose of this letter is to inform you that I give Dr. Fredricka Reisman permission to conduct the research titled *A Study of High School Teachers' Experiences Making Innovations to Instruction* at <*Names of Each High School*>. This also serves as assurance that this school complies with requirements of the Family Educational Rights and Privacy Act (FERPA) and the Protection of Pupil Rights Amendment (PPRA) (see attached for specific requirements) and will ensure that these requirements are followed in the conduct of this research. Investigator has permission to conduct the following listed research activities: survey of selected administrators; questionnaire of identified teachers; focus group with selected teachers; and individual interviews with selected teachers.

Sincerely,

<*Name of Assistant Superintendent for Secondary Education*>
Assistant Superintendent for Secondary Education

•The right of a parent of a student to inspect, upon the request of the parent, a survey created by a third party before the survey is administered or distributed by a school to a student. Any applicable procedures for granting a request by a parent for reasonable access to such survey within a reasonable period of time after the request is received.

•Arrangements to protect student privacy that are provided by the agency in the event of the administration or distribution of a survey to a student containing one or more of the following items(including the right of a parent of a student to inspect, upon the request of the parent, any survey containing one or more of such items): Political affiliations or beliefs of the student or the student's parent. Mental or psychological problems of the student or the student's family. Sex behavior or attitudes. Illegal, anti-social, self-incriminating, or demeaning behavior. Critical appraisals of other individuals with whom respondents have close family relationships. Legally recognized privileged or analogous relationships, such as those of lawyers, physicians, and ministers. Religious practices, affiliations, or beliefs of the student or the student's parent. Income (other than that required by law to determine eligibility for participation in a program or for receiving financial assistance under such program).

•The right of a parent of a student to inspect, upon the request of the parent, any instructional material used as part of the educational curriculum for the student. Any applicable procedures for granting a request by a parent for reasonable access to instructional material received.

•The administration of physical examinations or screenings that the school or agency may administer to a student.

•The collection, disclosure, or use of personal information collected from students for the purpose of marketing or for selling that information (or otherwise providing that information to others for that purpose), including arrangements to protect student privacy that are provided by the agency in the event of such collection, disclosure, or use.

•The right of a parent of a student to inspect, upon the request of the parent, any instrument used in the collection of personal information before the instrument is administered or distributed to a student. Any applicable procedures for granting a request by a parent for reasonable access to such instrument within a reasonable period of time after the request is received.

Appendix D: Invitation Email to Administrators

Dear <*Administrator's Name*>,

I am writing to invite you to participate in a research study that will investigate innovative teaching. By identifying teachers who make innovations to their instruction you may help to increase the likelihood that other teachers implement new and useful instructional practices in their classrooms. This study is being conducted as part of the dissertation requirement for my Doctoral Degree in Educational Leadership and Management at Drexel University under the supervision of Dr. Fredricka Reisman, Principal Investigator and dissertation Supervising Professor.

If you choose to participate, please follow the instruction in the attachment.

Participation in this study is completely voluntary, all participants will remain anonymous and you are free to decide not to participate or to withdraw at any time without consequence. All data collected during the conduct of this study will remain confidential. There are no known risks and/or discomforts associated with this study.

If you have any questions, I would be happy to talk to you in more detail. I can be reached at 215-262-3427 or by email at jpk78@drexel.edu. You may also contact the Principal Investigator: Fredricka Reisman, Ph.D., Drexel University (Philadelphia Campus), School of Education, 215-895- 6771; reismafk@drexel.edu

Thank you for your time and assistance. I look forward to your response!

Sincerely,

Jim Kearney
Co-investigator
Doctoral Candidate
Ed.D in Educational Leadership and Management
Drexel University, School of Education
215-262-3427 jpk78@drexel.edu

Thank you for you participation in the research study, *A Study of High School Teachers' Experiences Making Innovations to Instruction*

Please identify the total number of high school teachers in your school/school district in each core content area (English, mathematics, science, or social studies).

English _____
Mathematics _____
Science _____
Social Studies _____

Please identify current high school teachers in your school/school district who teach in a core content area and use new ideas, methods or strategies and activities to improve the teaching and learning processes (Zhu, Wang, Cai, & Engels, 2013). These teachers may or may not be the original creator of the instructional practice they put into place. The teachers should also demonstrate many of the following characteristics that contribute to teachers' innovative behavior (Thurlings, Evers, & Vermeulen, 2015).

1) Personality
    - Curiosity
    - Openness to change
2) Traits
    - Attitudes and beliefs that support innovation
    - Intrinsic motivation
    - Learning goal orientation: intentionally learns new skills and how to complete more complex tasks.
    - Self-efficacy: confidence in ability to meet challenges
    - Persistence/perseverance
    - Other: humor, job satisfaction
3) Competence
    - Develop specific competencies needed for teaching
    - Problem solving
    - Recognize and evaluate opportunities worth pursuing
    - Content knowledge of teaching

For each teacher, please identify their name, school, subject taught, and email address in the chart below and email it back to me at jpk78@drexel.edu. Add additional rows as needed.

Teacher's Name	**Teacher's School**	**Content Area(s)**	**Email Address**

Appendix E: Invitation Email to Teachers

Dear <*Teacher's Name*>,

I am writing to invite you to participate in a research study that will investigate innovative teaching. You were identified by administrators in your school district as a teacher who makes innovations to your instruction. We would like to have all invited teachers participate in the study. Unfortunately, due to the research design, not all teachers who initially were identified may be invited to participate in this study.

By sharing your experiences as part of this study you may help to increase the likelihood that other teachers implement new and useful instructional practices in their classrooms. This study is being conducted as part of the dissertation requirement for my Doctoral Degree in Educational Leadership and Management at Drexel University under the supervision of Dr. Fredricka Reisman, Principal Investigator and dissertation Supervising Professor.

If you choose to participate, data collection efforts will commence in two phases. Phase One is composed of a questionnaire. Please complete the questionnaire by following the link provided below. It is estimated that it will take less than 15 minutes for you to complete the questionnaire. After completion of Phase One, you may be invited to take part in Phase Two of this research study.

Questionnaire Link: <*Link to Questionnaire url*>

Your Pseudonym: <P*articipant's Assigned Pseudonym*>

Phase Two is composed of a focus group interview that will take approximately 60-90 minutes. For the purpose of data collection, I ask that I be permitted to audio record the interview and take handwritten notes throughout the process. Some participants may be asked to participate in individual interviews that will last approximately 30-45 minutes. I will try to schedule the focus group interviews in <*name of school district*> high schools for the convenience of participants.

Participation in this study is completely voluntary, all participants will remain anonymous and you are free to decide not to participate or to withdraw at any time without consequence. All data collected during the conduct of this study will remain confidential. There are no known risks and/or discomforts associated with this study.

If you have any questions, I would be happy to talk to you in more detail. I can be reached at 215-262-3427 or by email at jpk78@drexel.edu. You may also contact the Principal Investigator: Fredricka Reisman, Ph.D., Drexel University (Philadelphia Campus), School of Education, 215-895- 6771; reismafk@drexel.edu

Thank you for your time. I look forward to your response!

Sincerely,

Jim Kearney
Co-investigator
Doctoral Candidate
Ed.D in Educational Leadership and Management
Drexel University, School of Education
215-262-3427 jpk78@drexel.edu